UNIVERSITY OF PENNSYLVANIA

BRITISH REGULATION OF THE COLONIAL IRON INDUSTRY

ARTHUR CECIL BINING

A THESIS

IN HISTORY

PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

PHILADELPHIA
1933

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OF THE
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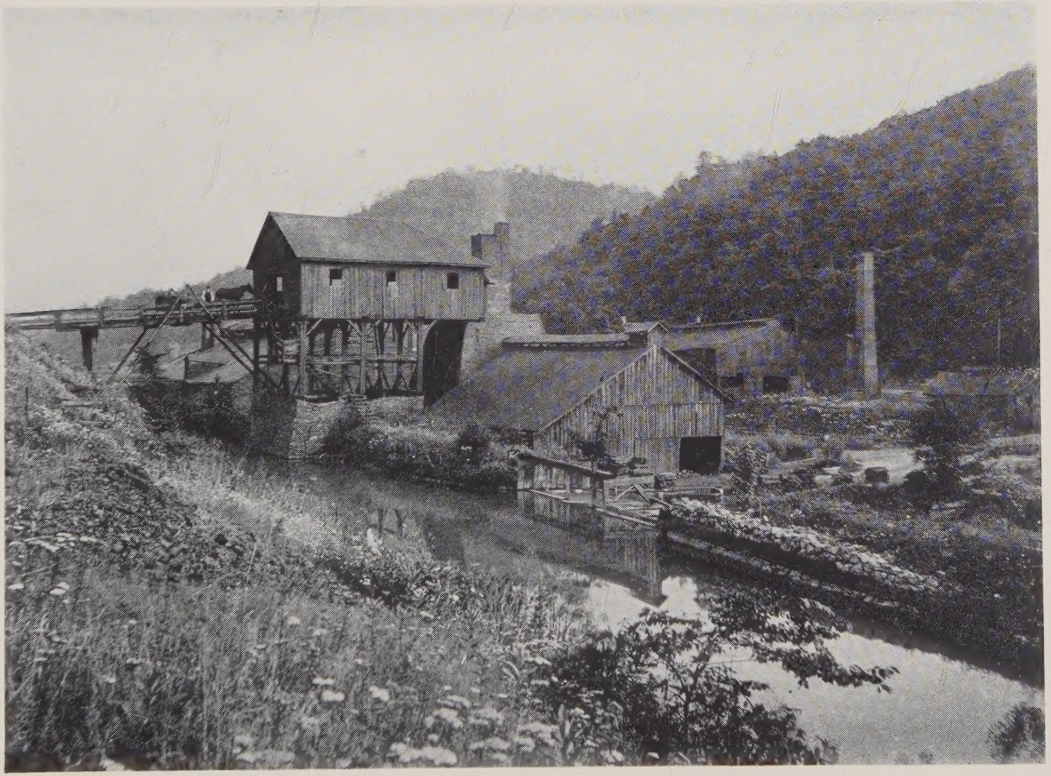

HECLA FURNACE

Milesburg, Pennsylvania

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1933

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To My Wife

INEZ PETRY BINING

PREFACE

This study treats a neglected phase of British colonial policy. It is an investigation of the attempts made by Great Britain to regulate and control the growing iron industry in the American colonies at a time when the Americans were becoming her competitors in the production of iron, and when colonial iron manufactures were interfering with English manufactures of the same kind. Many factors, interwoven and tangled, must be considered in seeking the reasons for the legislation adopted by the mother country for the regulation of the colonial iron industry. Many elements, also, must be examined and evaluated in order to discover the effects of such legislation. This monograph undertakes to analyze these complex factors and to trace the historical development of this aspect of the relations between England and her American colonies.

In the preparation of this study, I have been favored with the counsel of a number of scholars, all of whom have offered suggestions for its improvement. It gives me pleasure to express my thanks to Professor Albert E. McKinley, Professor Herman V. Ames, Professor St. George L. Sioussat, Professor Roy F. Nichols, and Dr. Leonidas Dodson, of the University of Pennsylvania, to Professor John W. Oliver of the University of Pittsburgh, and to Professor Lawrence H. Gipson of Lehigh University. I wish especially to thank Professor Charles M. Andrews of Yale University for his valuable and constructive criticisms of the manuscript. To Professor William E. Lingelbach of the University of Pennsylvania and Mr. Phelps Soule of the University of Pennsylvania Press, I am grateful for suggestions in solving problems relating to publication. To Messrs. W. J. Bining, A. E. Hutcheson, and T. R. Schellenberg, I am obligated for reading the manuscript and the proof.

I wish also to express my appreciation of the courteous assistance and indispensable aid given me by the librarians and

their staffs at the various libraries where the material for this study was collected, especially at the libraries of the Historical Society of Pennsylvania and the Massachusetts Historical Society, the Library of Congress, the University of Pennsylvania Library, the New York Public Library, the Carnegie Library of Pittsburgh, and to Dr. R. G. Adams of the William L. Clements Library of American History. My thanks are also due to the officials of the Public Record Office. To all these and to many others who have aided me in any way, I am deeply grateful.

ARTHUR CECIL BINING

Philadelphia, 1933.

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HECLA FURNACE, MILESBURG, PENNSYLVANIA .... *Frontispiece*

Courtesy of Richard Peters. This furnace was built in the nineteenth century, but is typical of the blast furnaces of the colonial period, being a cold-blast charcoal furnace of the same dimensions, and operated in the same manner, as colonial blast furnaces. Compare with plan of eighteenth century furnace, page 66.

THE BLOOMERY 11

From T. Richard, *Etudes sur l'Art d'Extraire Immédiatement le Fer de ses Minerais sans Convertir le Métal en Fonte.* At the bloomery, wrought iron was made by heating the ore in a charcoal fire and working it into a semi-molten mass. It was then hammered into bar iron under ponderous hammers, driven by water wheels. This process was known as the Catalan process.

THE REFINERY FORGE 28

From D. Diderot and J. B. le Rond d'Alembert, *Recueil de Planches sur les Sciences, les Arts Libéraux, et les Arts Méchaniques,* Troisième Livraison, Forges: Section 4, Plate V. At the refinery forge, pig iron from the blast furnace was heated in a charcoal fire, hammered, and refined into anconies and bars of wrought iron.

FORGING AN ANCONY AT THE REFINERY FORGE .... *facing* 40

From D. Diderot and J. B. le Rond d'Alembert, *Recueil de Planches sur les Sciences, les Arts Libéraux, et les Arts Méchaniques.* Troisième Livraison, Forges: Section 4, Plate VI. The completed ancony was a thick, flat bar, with a rough knob on each end.

REFINERY FORGE HAMMER ..... *facing* 52

The forge hammer was massive. Its iron head was mounted on an oak beam, and weighed from 400 to 600 pounds. The hammer at the colonial forge was generally parallel with the shaft or drum, the cams of which caught the helve or beam a short distance below the hammer-head.

PLAN OF EIGHTEENTH CENTURY COLD-BLAST CHARCOAL FURNACE 66

Courtesy of Richard Peters.

ROLLING AND SLITTING MILL ..... *facing* 72

From D. Diderot and J. B. le Rond d'Alembert, *Recueil de Planches sur les Sciences, les Arts Libéraux, et les Arts Méchaniques,* Troisième Livraison, Forges: Section 5, Plate III. Iron bars from the forge were heated, rolled, re-heated, and slit at the rolling and slitting mill. Slit iron was used for making nails. Note the heated bar of iron in process of being slit. Compare this plate with the plan of the Middleboro, Mass., Rolling and Slitting Mill, which was built about the middle of the eighteenth century, page 90.

PLAN OF ROLLING AND SLITTING MILL, MIDDLEBORO, MASS. 90

From American Society of Mechanical Engineers, Transactions, II (1881), 104. Water power was used to drive all the machinery in these eighteenth century mills.

BLISTER STEEL FURNACE 107

From F. Overman, *Manufacture of Steel,* p. 121. Only one type of steel was made in the colonies—blister or cemented steel. Forged iron bars with alternate layers of crushed charcoal were placed in the cementation boxes or pots. After the boxes were filled to the top, the fire was lighted. The boxes were kept at a certain heat, cherry-red in color, from seven to twelve days, depending upon the hardness of the steel desired. The carbon from the crushed charcoal was absorbed by the bars during this process, and the iron bars were converted into steel. The dimensions of the boxes of the colonial steel furnaces were about three feet high, three feet wide, and fifteen or sixteen feet long.

PLATING MILL ..... *facing* 116

From D. Diderot and J. B. le Rond d'Alembert, *Recueil de Planches sur les Sciences, les Arts Libéraux, et les Arts Méchaniques,* Cinquième Livraison, Metallurgie, Fer Blanc: Plate I. Sheet iron was never rolled during colonial days. Instead, iron bars were hammered into sheet iron or tin-plate iron under large hammers, driven by water wheels, at the plating mill.

INTRODUCTION

MANY reasons have been advanced for the development of England's commercial policy toward her American colonies. The view of George Bancroft and the older historians that the colonial system was founded on injustice[1] has not been upheld by later investigators. G. L. Beer finds that the relations between England and the colonies were "based on economic principles, and but slightly influenced by political considerations."[2] Eleanor Lord asserts that in theory the colonial system was one of exchange which was mutually advantageous, the colonists developing their natural resources and the mother country engaged in manufacturing, although regulation was intended to make the plantations subservient and as useful as possible. Neglect, together with ignorance of conditions in the New World, and the sudden effort after 1763 to enforce restrictive legislation following years of laxity, led to the Revolution.[3] A. A. Giesecke states that "as a background for the commercial legislation for the American colonies, we should keep in mind the purposes which the colonies were expected to serve in the general scheme of the British Empire."[4] Many other historians have concluded that the regulative and restrictive legislation passed by Parliament was part of an intelligently conceived plan to build up a self-sufficing empire.

The belief of Weeden that the colonies "were accidents politically considered" and that "their administration and regulation, political and economic, were controlled by the exigencies of English contests with continental powers,"[5] has been supported

[1] George Bancroft, *History of the United States* (Twenty-second Edition), IV, 461-462.

[2] *Commercial Policy of England towards the American Colonies,* p. 144.

[3] *Industrial Experiments in the British Colonies of North America,* Preface.

[4] *American Commercial Legislation before 1789,* p. 1.

[5] *Economic and Social History of New England,* II, 734.

recently by T. S. Ashton.[6] Another writer on this subject, H. E. Egerton, declares that if by "policy" is meant "a premeditated advance to a definite goal," then England had no such plan. "Nevertheless," he continues, "behind the dim gaze and circumscribed horizon of each individual generation, we recognize forces at work fitting events, apparently fortuitous, into the scheme of a mighty system. The thoughtful student of the past finds himself somewhat in the position of Æneas, when, enlightened by his goddess mother, he recognized the deliberate work of the very gods in what at first had seemed the mere sport of fire and chaos."[7] The problem of England's relations to her American colonies is complex, and its answer cannot be reduced entirely to a few simple principles.

It is true that the mercantile theory is the drab background of the colonial system. Yet a fair and impartial study of the conditions which brought about the attempts to regulate the colonial iron industry at least will reveal many factors which have not been given the consideration they deserve. Economic theory, economic conditions in England, political principles, relations with continental countries, especially Sweden, and above all, the resounding clash of conflicting groups of Englishmen seeking their own advantages and interests must be considered. It is the purpose of this study first, to show that the self-interest of the various groups in England, who took advantage of all conditions and exigencies to further their own ends, was an exceedingly important, if not the outstanding factor in securing legislation to control the rapidly developing iron industry in the American colonies.

The second aim of this monograph is to present a fair interpretation of the legislation which was intended to regulate the colonial iron industry. The act of 1750 was worded in such a way as to be misunderstood by many contemporaries, even by members of Parliament who voted on the measure. Down to the present time it has been grossly misinterpreted. The subsidiary measures of 1757 and 1764 also have not been thor-

[6] *Iron and Steel in the Industrial Revolution*, p. 126.

[7] *Short History of British Colonial Policy* (1905 Edition), pp. vii-viii.

oughly understood, nor have they been placed in their proper perspective.

A third objective is to point out the results of British legislation during the short period from the passage of the act of 1750 to the outbreak of the Revolution. In spite of general opinion on the subject, the attempt to encourage the production of pig iron and bar iron in the colonies for use in the manufactures of the mother country was a decided failure. American iron played no great part in the economy of Great Britain at any time during the seventeenth or eighteenth centuries. The few thousand tons of iron sent to England during the entire colonial period constituted a small amount when compared with the large quantities made and used in the colonies. Likewise, the amount of such iron was relatively insignificant when contrasted with the annual importations into Great Britain from Sweden, Russia, and other foreign countries.

The attempt to prohibit the erection of certain types of works, including rolling and slitting mills which produced slit iron for manufacturing nails; plating mills, which turned out sheet iron for making kettles, pans, and other utensils; and steel furnaces, where steel was made for the better grade of tools, resulted in disobedience on the part of the colonial ironmasters. The restrictive clauses of the act of 1750 were almost entirely disregarded. Yet they found a place in the long list of grievances which led the colonists to sever their relations with the mother country.

Another aim of this study is to show the rapid growth of the iron industry in the colonies in the period following the Peace of Utrecht. Before the colonial period closed the production of pig iron and bar iron in America was beginning to rival that of Great Britain. The colonists manufactured most of their iron into wares and products. This naturally violated the principle that no manufactures which interfered with those of the mother country should be permitted in the colonies. It resulted, also, in defeating England's plan of obtaining iron from her possessions for her extensive manufactures of iron wares. Though the number of furnaces and forges in the colonies in

1775 exceeded the number in England and Wales at the same time, within a few years the changes brought about by the Industrial Revolution, especially the substitution of coke for charcoal in the blast furnaces, completely changed the condition of the iron industry in Great Britain, and in the years that followed, the production of iron there increased to an amazing degree.

The rapid expansion of the colonial iron industry prepared the way for the Revolution. The blast furnaces were turned to new uses and produced ordnance and utensils for the armies. Many of the forges and smitheries, large and small, made weapons of various kinds and other articles needed for warfare. Steel made at steel furnaces furnished the material required for the best grade of weapons. If the colonial iron industry had not reached such a high stage of development by 1775, the colonists would have had small chance for success in their struggle for independence.

The development of industry in the colonies has been considered of minor importance by historians, and few serious studies have been made in this field. The chief reason for the neglect of so important a phase of colonial history may be found in the scattered nature of the sources, while in many cases documentary and statistical evidences are entirely lacking. In view of the antagonistic attitude of England toward the development of manufactures in the colonies, little news of the manufacturing activities of the colonists reached the mother country, and even the royal Governors had good reasons for not keeping the Board of Trade informed about industrial developments.

Colonial manufactures are treated in such general works as J. L. Bishop's *History of American Manufactures*, R. M. Tryon's *Household Manufactures in the United States*, and especially V. S. Clark's *History of Manufactures in the United States*. These are extremely valuable, but monographs on the leading colonial industries, based on further research, are needed. If this is done, the extent of colonial industry may be known and the background of our present industrial system will be better understood.

I

A SURVEY OF THE COLONIAL IRON INDUSTRY

> Iron is a considerable article in our manufactures.—William Douglass, *British Settlements in North America*, I, 540.

DURING the second expedition sent to America by Sir Walter Raleigh in 1585, Thomas Hariot, the historian of the group, pointed out that the manufacture of iron in the New World would be advantageous to the mother country. The abundance of ores, together with an infinite supply of wood from the vast forests, and the low cost of labor in a land of plenty, he believed, would make the production of iron profitable in the proposed colony.[1] The suggestion was important in view of the growing shortage of wood in England. The enclosures which were being cleared of much of their forests in order to grow wheat or raise sheep, together with the vast amount of charcoal consumed by English blast furnaces and forges, had brought about a serious shortage of timber. This condition threatened national security because the scarcity of wood seemed likely to affect shipbuilding.[2] The diminishing woodlands constituted a grave problem at a time when a realization of the need for much timber for naval purposes was developing. Many restrictive acts, therefore, were passed, which prohibited the owners of ironworks in certain regions from cutting trees for fuel, and even forbade the erection of new works in several places where little

[1] *A Briefe and True Report of the New Found Land of Virginia*, p. 17.

[2] Dud Dudley, one of the earliest ironmasters to experiment with mineral coal in the smelting of iron, wrote: "Now if Wood and Timber should decay still, and fail, the greatest strength of *Great Britain*, her Ships, Mariners, Merchants, Fishings, and His Majesties Navies, and Men of War, for our Defence and Offence would fail us." *Metallum Martis*, p. 2.

wood remained.[3] Hariot's judicious suggestion of utilizing England's possessions in North America to save the depleted forests of Great Britain came to nought at this time, for all attempts at colonization failed.

About twenty years later, the Virginia Company of London was formed to colonize Virginia. From the earliest days of settlement the company planned to build ironworks and also to develop other manufactures in the new colony.[4] In 1608, the year following the landing of the first settlers, several tons of iron ore were sent to England, smelted there, and sold to the East India Company.[5] In 1610, Sir Thomas Gates, testifying before the Council in London, stated that there were many minerals, especially "iron oare" in the colony, some of which had been sent home and had yielded as high-grade iron as any in Europe.[6] The many difficulties which had to be met in establishing the new colony prevented the immediate erection of ironworks. By 1620, a large number of workmen had been sent to erect three works on Falling Creek, sixty-six miles above James-

[3] As early as 1543, an act was passed which regulated the cutting of the coppices, but it did not extend to the Weald of the countries of Surrey, Sussex, and Kent, where the influence of the ironmasters was strong. 35 Henry VIII, c. 17. In 1558, all ironworks except those in the Weald were prohibited from using oak, beech, or ash of a stated size, growing within fourteen miles of the sea or any navigable river. I Elizabeth, c. 15. An act of 1581 prohibited the erection of new furnaces and forges within twenty-two miles of London, and in other specified places. Once again the Weald was excepted. 23 Elizabeth, c. 5. A subsequent act, however, prohibited the erection of new ironworks in Surrey, Sussex, and Kent, and provided that no timber of a certain growth should be used as fuel at any ironworks in those regions. 27 Elizabeth, c. 19. A royal decree of 1637 provided for the strict enforcement by commissioners of these laws and also the legislation prohibiting the exportation of iron. *Tudor and Stuart Proclamations,* I, 211.

[4] *Nova Britannia* (1609), in Peter Force, *Tracts and Other Papers,* I, No. 6, p. 16; *A True and Sincere Declaration of the Purpose and Ends of the Plantation Begun in Virginia,* in Alexander Brown, *Genesis of the United States,* I, 340, 353, 356.

[5] W. Strachey, *Historie of Travaile into Virginia,* p. 132; *Calendar of State Papers, East Indies,* 1513-1616, p. 181; E. D. Neill, *History of the Virginia Company,* pp. 20, 22.

[6] *A True Declaration of the Estate of the Colonie in Virginia* (1610), in Peter Force, *Tracts and Other Papers,* III, No. 1, p. 22.

town.[7] The lighting of the furnaces was the signal for the terrible Indian massacre on March 22, 1622. The works were demolished and the ironworkers were slain.[8] Before the Virginia Company had time to recover from this blow, it lost its charter in 1624 and the plantation reverted to the crown.

The catastrophe of 1622 put an end to iron making in Virginia for almost a hundred years, although in the meantime many attempts were made to establish ironworks there. The Governor and Council wrote to the Virginia Company in 1624 that they were planning to turn their attention to the production of staple commodities, including iron.[9] Four years later a proposal was made to aid the establishment of ironworks by securing from the English government a charter for a joint-stock company for that purpose. It was suggested that the company be granted a monopoly of iron making in Virginia for fourteen years, together with freedom from customs and duties on all iron sent to England.[10] In 1630, further interest was shown when Governor John Harvey visited the ruins of the ironworks which had been destroyed during the Indian massacre of 1622.[11] Later he wrote to the Privy Council that he was attempting to turn the attention of the Virginians from the culture of tobacco to the production of potash, saltpetre, and iron, as well as to the growing of wheat. To aid him in this purpose he recommended that the English duties on tobacco be trebled, and he also asked that skilled workmen be sent "to set the ironworks on foot."[12] No action was ever taken on these suggestions.

About the middle of the seventeenth century a careful observer declared that ironworks in Virginia "would be as much worth as a Silver Mine all things considered; not onely to make all Instruments of Iron for the Plantations Uses, but for Build-

[7] *A Declaration of the State of the Colonie and Affairs in Virginia* (1620), *Ibid.* III, No. 5, p. 10; E. D. Neill, *History of the Virginia Company,* pp. 338-339.

[8] *Ibid.,* pp. 339 ff.

[9] *Calendar of State Papers, America and West Indies,* 1574-1660, p. 57.

[10] *Ibid.,* pp. 90-91.

[11] *Ibid.,* p. 113.

[12] *Ibid.,* p. 160.

ing, Shipping, there being wanting in that Countrey no other Materialls to that Worke."[13] Williams, another contemporary writer, blamed the Virginia merchants for lack of enterprise in not building ironworks.[14] The want of interest in the manufacture of iron in the colony was due to the relatively great cost of building such works in a country where capital was scarce, together with the absorbing interest of the planters in their tobacco plantations. Governor Berkeley took the position that the government should assist in the development of industries where great cost was involved. The reason why iron making and shipbuilding had not developed in Virginia, he stated, was because "there never was yet any publick encouragement to assist the Planters in those most chargeable undertakings."[15]

From time to time many persons in England and America pointed out the advantages which would accrue to the mother country if iron could be smelted in Virginia and in the other colonies. In their opinion it would not only furnish markets for England to obtain raw or semi-finished material, but it would also provide means by which the colonists could pay for English goods. Besides, it would save the British forests from further depletion.[16] In spite of this interest in favor of the establishment of ironworks, and although the Virginia legislature discussed plans to encourage the beginning of an iron industry, the first works in that colony were not established until the eighteenth century was well under way.[17]

[13] *A Perfect Description of Virginia* (1649), in Peter Force, *Tracts and Other Papers,* II, No. 8, p. 5.

[14] *Virginia* (1650), *Ibid.,* III, No. XI, pp. 14-15.

[15] *A Discourse and View of Virginia,* p. 5.

[16] Francis Bacon, "Essay on Plantations," *Works,* I, 41; *Nova Brittania* (1609), in Peter Force, *Tracts and Other Papers,* I, No. 6, p. 16; "An Account of Virginia," Massachusetts Historical Society, *Collections,* First Series, V, 125-126; Board of Trade Papers: Plantations General, IX, K 134.

[17] Owing to the great scarcity of iron tools and implements in Virginia, laws were passed during the seventeenth century forbidding the exportation of any kind of old iron from the colony. The first measure, adopted in 1657-1658, forbade the exportation of iron on a penalty of ten pounds of tobacco for every pound of iron exported. W. W. Hening, *Laws of Virginia,* I, 488. The act was repealed the next year. *Ibid.,* I, 525. A similar law of 1682-1683 was disallowed by the Privy Council. *Ibid.,* II, 493; *Legislative Journals*

The colonial iron industry first took root, not in Virginia, but in New England. In Massachusetts Bay Colony, as in the "Old Dominion," the manufacture of iron was intended from the very beginning of settlement.[18] While plans were formulated at the time of the first migration for the development of the iron resources of the colony, it was not until 1641 that John Winthrop, Jr., the son of the old Governor, left for England with the object of securing capital to build ironworks in Massachusetts.[19] A short time later Robert Bridges followed him to London with specimens of bog ore from the ponds of Saugus (Lynn).[20] In May 1643 Winthrop and Bridges, after organizing the "Company of Undertakers for the Iron Work," set sail from London to Boston in the ship *An Cleeve*, taking with them "many workmen, servants, and materialls" for the proposed works.[21] However, missing a favorable wind, the vessel kept beating about the English coast for weeks and did not reach Boston until autumn. Too late to begin operations because of severe weather, the workmen remained unemployed until the following spring. Winthrop drew up a petition asking Parliament for reimbursement for his loss owing to the idleness of the workmen.[22]

In the spring of 1644 preparations were made for manufacturing iron on a relatively large scale in Massachusetts Bay

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of the Council, 1, 42, 53; III, 1505. Under the act of 1691, which was not put into effect, a duty of one penny a pound was to be imposed on all iron exported. W. W. Hening, *Laws of Virginia,* III, 63. Other attempts were made to retain such iron as the colony possessed. *Journals of the House of Burgesses,* 1695-1702, pp. 163, 171.

[18] *Records of the Governor and Company of Massachusetts,* I, 28, 30.

[19] *Winthrop Papers,* Massachusetts Historical Society, *Collections,* Fifth Series, VIII, 35.

[20] Essex Institute, *Collections,* XVIII, 243.

[21] *Winthrop Papers,* Massachusetts Historical Society, *Collections,* Fifth Series, VIII, 36-37. In his history, John Winthrop, Sr., states: "Mr. John Winthrop, the younger, coming from England, brought with him 1,000 pounds stock and divers workmen to begin an iron work." *History of New England,* II, 121.

[22] Draft of Petition to Parliament, *Winthrop Papers,* Massachusetts Historical Society, *Collections,* Fifth Series, VIII, 36-37. There is no evidence to show that the petition was ever presented to Parliament.

Colony. The General Court granted the company a monopoly of making iron for twenty-one years as well as the right to obtain three square miles of land in each of six different places if it set up within ten years a furnace and forge on each location, "and not a blomery onely."[23] The proprietors were required to "use their best endeavors to their utmost skill to perfect so many of the said workes that the inhabitants of this jurisdiction be furnished with barr iron of all sorts for their use, not exceeding twentye pounds per tunn."[24] The company was freed from all public charges and from taxation upon its stock. The proprietors and the workmen were exempted from all military "trainings," and from "watchings" for Indians.[25] Works were soon erected at Lynn on the Saugus River and at Braintree, ten miles south of Boston.[26]

Although excellent iron was smelted, cast, and forged from the bog ores of Massachusetts at these two ironworks, the company became continually involved in litigation which lasted for more than a quarter of a century. The company was sued by its agents and frequently it brought suit against them; the partners sued each other from time to time; workmen sought legal redress for wages long overdue, and creditors often obtained judgments. Many lawsuits also arose over damages to neighboring property caused by overflow of water and the breaking of dams.[27] Hubbard, a contemporary writer, said that "whether *faber aut forceps aut ars ignara fefellit*, instead of

[23] *Records of the Governor and Company of Massachusetts,* II, 62.

[24] *Ibid.,* II, 125

[25] *Ibid.,* II, 81-82.

[26] Lynn Iron Works MSS.; *Winthrop Papers,* Massachusetts Historical Society, *Proceedings,* Second Series, VIII, 13 ff. The Lynn Works were often called the Hammersmith Iron Works because the skilled workmen had been brought over from a town of that name in England. For the history of these works see A. Lewis and J. R. Newhall, *History of Lynn,* pp. 93-280, *passim;* Essex Institute, *Collections,* XVIII, 241 ff.; W. S. Pattee, *History of Old Braintree and Quincy,* pp. 450 ff.; G. L. Kittredge, "Dr. Robert Child the Remonstrant," Colonial Society of Massachusetts, *Publications,* XXI, 7-67, *passim.*

[27] *Records and Files of the Quarterly Courts of Essex County,* I, 284 ff. *passim;* II, 130 ff. *passim;* III, 42 ff. *passim;* IV, 150 ff. *passim;* V, 44 ff. *passim;* VI, 166 ff. *passim;* VII, 26 ff. *passim;* VIII, 38 ff. *passim.*

drawing out bars for the country's use, there was hammered out nothing but contention and lawsuits, which was but a bad return for the undertakers."[28] Both works eventually passed into the possession of others.[29]

THE BLOOMERY

Not very long after these works of Massachusetts Bay Colony went into operation, an unsuccessful attempt was made to work the bog ores of Plymouth. Timothy Hatherly, one of the founders of Scituate, asked permission to erect ironworks. His request was granted in 1650 with the provision that the woodlands given him about Mattakeeset Pond should revert to the colony if his works were not erected within three years.[30] His plan did not mature, and it was not until 1702 that a furnace was built in this neighborhood.[31]

However, in 1652 a bloomery, for making bar iron directly

[28] W. Hubbard, "History of New England," Massachusetts Historical Society, *Collections,* Second Series, VI, 374.

[29] A. Lewis and J. R. Newhall, *History of Lynn,* p. 280; W. S. Pattee, *History of Old Braintree and Quincy,* pp. 461 ff.

[30] *Records of Plymouth Colony,* II, 127, 156.

[31] Massachusetts Historical Society, *Collections,* Second Series, IV, 224.

from the ore, was built on the frontier in the colony of Plymouth by a company composed of inhabitants of Taunton. The plant was known as the Raynham Works. Two brothers, Henry and James Leonard, whose family became important in the manufacturing of iron in the colonies, were employed to direct the workmen.[32] In 1665, the English commissioners reported to their government the existence of this works.[33] During the dread Indian uprising known as King Philip's War, the works became one of the centers of attack and the scene of bloodshed and terror. After the troubles with the Indians were over, this forge continued in operation for about two hundred years.[34]

Because of the failure of the company at Lynn and Braintree to supply a sufficient amount of iron for Massachusetts Bay Colony, and also owing to the fact that the price of iron had exceeded that provided for in the monopoly, the General Court granted the people of Concord and Lancaster permission to erect ironworks. A company was incorporated at Concord in 1658 and two years later the Concord Works began operation.[35] Among several small works erected in the colony before the close of the century was the forge which Nathaniel and Thomas Leonard built in 1668 at Rowley village. Like many other projects of this period, it was not successful, and its existence came to an end in a few years.[36]

An attempt to manufacture iron was begun early in the colony of Connecticut. John Winthrop, Jr., always enthusiastic in his attempts to promote industry in New England, petitioned the General Court for permission to lay out plantations and ironworks at Pequot (New London).[37] This was granted in 1644,

[32] Dr. Fobes, "Description of Raynham," *Ibid.*, First Series, III, 170 ff.; F. Baylies, *Historical Memoir of the Colony of New Plymouth,* I, Part 2, p. 268.

[33] *Calendar of State Papers, America and West Indies,* 1661-1668, p. 344.

[34] W. R. Deane, *Genealogical Record of the Leonard Family,* pp. 5 ff.

[35] *Records of the Governor and Company of Massachusetts,* IV, Part I, p. 311; L. Shattuck, *History of the Town of Concord,* p. 43.

[36] *Records and Files of the Quarterly Court of Essex County,* VI, 1-5; J. B. Felt, *Annals of Salem,* I, 282.

[37] *Records of the Governor and Company of Massachusetts,* II, 71. Petition in *Winthrop Papers,* Massachusetts Historical Society, *Collections,* Fourth Series, VI, 517-518.

but no evidence has been found to show that the works were ever built.[38] In partnership with William Paine and others, John Winthrop, Jr., built works at New Haven, which consisted of a blast furnace and forge. These went into operation in 1657.[39] A few bloomeries were built in this region before the century closed. Ores taken from bogs and ponds were used, for it was not until just before the middle of the eighteenth century that the rich ore deposits of western Connecticut were discovered and worked.[40]

Roger Williams attempted to encourage the erection of ironworks in Rhode Island. In 1654 he asked John Winthrop, Jr., to assist him in promoting works at Providence.[41] Soon afterwards Joseph Jenks, the son of the machinist and moulder who made the dies for the pine-tree shillings and patented many inventions, left Lynn and built a bloomery at Pawtucket. During the Wampanoag war with the Narragansett Indians in 1675, it was completely destroyed.[42] Whether any other ironworks were established in Rhode Island before the end of the seventeenth century is difficult to say, for no records of any have been found.

On the whole the attempts to establish an iron industry in New England during the seventeenth century were not very successful. Several of the enterprises failed and most of the works were in operation only intermittently. It was estimated that there were only five ironworks in the New England colonies in 1673.[43] A few years later Edward Randolph reported to the home government the existence of six.[44] Many factors contributed to prevent the development of the industry. Numerous law-

[38] Benjamin Trumbull, *Complete History of Connecticut* (1818 Edition), I, 169 ff.

[39] *Winthrop Papers,* Massachusetts Historical Society, *Collections,* Fourth Series, VII, 403, 404, 406, 477, 524.

[40] J. B. Pearse, *History of Iron Manufacture,* p. 38.

[41] Roger Williams to John Winthrop, 15th. 12th. Month 1654, *Winthrop Papers,* Massachusetts Historical Society, *Collections,* Fourth Series, VI, 286-292.

[42] A. Lewis, *History of Lynn,* p. 121.

[43] A. Holmes, *American Annals,* I, 416.

[44] *Calendar of State Papers, America and West Indies,* 1675-1676, p. 465. Compare with *Ibid.,* pp. 220-221.

suits, Indian attacks, prejudice and opposition because of the large amount of wood consumed by the works, and a preference for English iron, all must be considered among the many reasons which prevented the development of colonial iron manufacture at this time. Not until after the close of Queen Anne's War and during the years which followed was the iron industry definitely established in the American colonies.

During this period of industrial expansion which took place in the northern colonies and even in some of the southern colonies following the signing of the Treaty of Utrecht, the lagging iron industry of New England, especially, revived. New furnaces and bloomeries were established along rivers and creeks. In 1731, according to a report made to the Board of Trade, there were in New England six furnaces for casting hollow ware and nineteen bloomery forges for making bar iron directly from the ore, as well as one slitting mill and nail works.[45] Before the close of the colonial period there were at least fourteen furnaces, forty-one forges, four slitting mills, two plating mills, and one steel furnace, in Massachusetts alone.[46] Other New England colonies also were taking steps toward industrialization, and iron manufacture was developing rapidly in these. In answer to the requests of the Board of Trade in 1766 and 1768, Rhode Island reported two blast furnaces, one for making pig iron, the other for hollow wares, and also ten forges (bloomeries) for producing iron directly from the ore.[47] Connecticut reported one furnace for making pig iron, "sundry" refinery forges, and one steel furnace.[48] Besides these, Connecticut boasted of at least eight plating mills,[49] which busily hammered out sheet iron,

[45] William Douglass, *British Settlements in North America,* II, 109.

[46] Colonial Office Papers, 5:889. These furnaces and forges were reported in 1758, but the various reports differed in regard to the number of works of other types which were restricted under the law of 1750. At no time were they all included in the replies of the Governors. See also *Ibid.,* 5:886.

[47] *Ibid.,* 5:1281.

[48] Board of Trade Papers: Proprieties, XXII, Y 17; Connecticut Historical Society, *Collections,* XIX, 55-56.

[49] These works were at Killingworth, Woodstock, Plainfield, New London, Stonington, Groton, Saybrook, and Norwich. All had been built between

used in the manufacture of hoops for coopers, in the production of tin plate for the "white smiths," and for many other purposes.

Attempts were made also in New Hampshire to establish ironworks. The Lamper Eel Works were bloomeries and had experienced many difficulties owing to the lack of water in summer and "to hard frosts" in winter. The swamp and bog ores became scarce in this region before the middle of the eighteenth century, and the works ceased operation.[50] About this time forges were in operation at Rumford and at Kingston,[51] but few records remain to show the extent of their activities. On the eve of the Revolution, Governor Wentworth reported that there were three forges in the colony, and that a fourth was being built.[52]

The geographical distribution of New England blast furnaces and bloomeries was determined by supplies of ore and wood, as well as by the availability of creeks and streams. A few refinery forges were operated in conjunction with furnaces. Unlike the furnaces of the middle and southern colonies, the Massachusetts furnaces produced cast-iron wares and not pig iron; therefore the combination of blast furnace and refinery forge within the one plant found in other colonies did not exist there. Many Massachusetts and other New England forges, dependent upon other colonies for pig iron, were built on streams near towns or villages, but always where a supply of wood for fuel could be obtained. Slitting mills and plating mills, not being dependent on charcoal fuel, because they could use mineral coal, were usually located in the settled regions, but near water power which operated the large wooden water wheels necessary to turn cumbersome machinery. The steel furnaces of this period were also found in the towns.

The first ironworks in Maryland, a bloomery built in 1715,

1732-1748. Board of Trade Papers: Proprieties, XVIII, V, 88; Connecticut Historical Society, *Collections,* XVI, 74-75.

[50] William Douglass, *British Settlements in North America,* II, 50.

[51] New Hampshire Historical Society, *Collections,* IV, 254; *New Hampshire Provincial Papers,* XXIII, 468.

[52] Governor Wentworth to the Earl of Dartmouth, April 20, 1774, Dartmouth Papers: State of the British Islands in the West Indies, I.

in Cecil county "at the head of the bay," was the origin of the famous Principio Works.[53] The first quantity of bar iron exported from the colonies to the mother country in 1718 was made at this forge.[54] Emanuel Swedenborg, who traveled through the colonies, saw the Principio Works in operation and described them in his book published in 1734.[55] Beginning in 1719, acts were passed by the legislature of Maryland for the purpose of encouraging the establishment of ironworks. The act of 1719 extinguished the rights of the proprietor to royalty on minerals and also authorized the grant of 100 acres of choice unoccupied lands at assessed damages to those who would set up ironworks in the province.[56] Other laws exempted ironworkers from all labor on roads and highways, although objection was made to this in 1749 and 1750, when it was provided that one-tenth the number of workmen at each works should be liable for service on the public roads and bridges.[57] Under the acts of encouragement, marked progress was made in the manufacture of iron in Maryland. Reports made to the Board of Trade in 1749-1750 show that there were in the colony at that time eight blast furnaces, nine forges, and one plating mill with two tilt hammers.[58] The report of 1762 declared that there were eight furnaces and ten forges in operation.[59] By the time of the outbreak of the Revolution, seventeen furnaces and eighteen forges had been built.[60]

The first important promoter of iron manufacture in New Jersey was Colonel Lewis Morris, who in 1676 moved to that

[53] Adam Anderson, *Origin of Commerce,* III, 63; Harry Scrivenor, *History of the Iron Trade,* p. 68. An excellent sketch of the Principio Works is that by Henry Whitely, "The Principio Company," *Pennsylvania Magazine of History,* XI (1887), 63-68, 190-198, 288-295.

[54] House of Lords MSS., No. 185.

[55] Emanuel Swedenborg, *Regnum Subterraneum sive Minerale de Ferro,* Part I, Section 13. In this very interesting Latin work, may also be found descriptions of the earliest Pennsylvania ironworks.

[56] *Laws of Maryland,* 1719, c. 15.

[57] *Maryland Archives,* XLVI, 212-470, *passim. Laws of Maryland,* 1732, c. 17; 1736, c. 17; 1750, c. 14.

[58] Board of Trade Papers: Proprieties, XVIII, V. 65, V. 71.

[59] *Ibid.,* XXI, (I), X 8.

[60] J. T. Singewald, *Iron Ores of Maryland,* pp. 128 ff.

colony from Barbados. Morris and his "associates in the Iron Works" received a large grant of land from the East Jersey proprietors, with the right to use all the iron found there.[61] These works were located at Shrewsbury, near Tinton Falls, and had been first established about the middle of the century.[62] Under Morris and his partners they prospered. In 1681 they consisted of a "Furnace and a Forging Mill."[63] Little further advance, however, was made in this colony in the manufacture of iron until the second decade of the eighteenth century.

Thus it was not until the years following the close of Queen Anne's War, when Maryland, Pennsylvania, and Virginia were beginning the manufacture of iron, that many furnaces and forges were built in the bog-ore regions of southern New Jersey. These works throve and prospered until just before the middle of the nineteenth century, when competition with the new Pennsylvania anthracite furnaces put an end to them, and desolation again marked the region which for more than a century had been an important center of industrial activity.[64] Ironworks were also established in the northern parts of New Jersey during the colonial period.[65] An idea of the extent of the industry in this colony may be obtained from the report of Governor Franklin, who in 1768 reported to the Board of Trade that there were in New Jersey eight blast furnaces and forty-two forges, besides one slitting mill, one plating mill, and one steel furnace.[66]

[61] New Jersey Historical Society, *Collections,* IV, 2, 3; George Scot, *Model of the Government of the Province of East New Jersey,* p. 128; Samuel Smith, *History of the Colony of Nova-Caesaria or New Jersey,* p. 158.

[62] E. B. O'Callaghan, *History of New Netherland,* II, 342.

[63] "Present State of the Colony of West Jersey, 1681," *Pennsylvania Magazine of History* (1894), XVIII, 159.

[64] K. Braddock-Rogers, *The Bog Ore Industry in South Jersey,* reprinted from *Journal of Chemical Education,* VII, No. 7, pp. 1493-1519.

[65] Besides the various works of the American Iron Company at Charlotteburg, Ringwood, and Long Pond, the most important works in northern New Jersey were the Andover, Boonton, Franklin, Mount Hope, Oxford, and Union Iron Works. C. S. Boyer, *Early Forges and Furnaces in New Jersey,* pp. 12 ff., 26 ff., 42 ff., 71 ff., 136 ff., 148 ff., 233 ff., Israel Acrelius, *History of New Sweden,* p. 166.

[66] Governor Franklin to Secretary Hillsborough, June 14, 1768, *New Jersey Archives,* First Series, X, 31.

The most remarkable of all the early industrial enterprises in the colonies were the projects of the American Iron Company, often known as the London Company. A group of Englishmen sent Peter Hasenclever to New Jersey in 1764 to establish ironworks. Within a short time he had spent a great amount of money on works at Charlotteburg, Ringwood, and Long Pond in New Jersey, and at Cortlandt in New York.[67] In 1765 and 1766 four blast furnaces and seven forges of twenty-four forge fires were built. Hasenclever transported 535 men and their families from Europe to build and operate these works.[68] The unfortunate manager exceeded his instructions by such a rapid expansion and had spent more than £54,000 before any returns whatever were made. This resulted in much dissatisfaction among the members of the company and therefore he was recalled in 1769. During and after the Revolution the various works passed into the hands of Americans.[69]

The year 1716 marked the beginning of the iron industry in Pennsylvania. From the time Thomas Rutter, the pioneer ironmaster, built the first bloomery forge in the forests of the Manatawny region in the Schuylkill Valley, iron manufacture in this colony developed with amazing rapidity. The first blast furnace, erected by Rutter and his associates in 1720, was named Colebrookdale after the famous works of Abraham Darby in Shropshire, England.[70] During the colonial period at least twenty blast furnaces and forty-five forges as well as ironworks of other types were built in the Schuylkill, Delaware, Cumberland, and Susquehanna Valleys.[71] As the frontier moved westward, ironworks were established in its trail. During the Revolu-

[67] *The Remarkable Case of Peter Hasenclever,* pp. 6-7; New Jersey Historical Society, *Proceedings,* New Series, IV, 57-58. See also *Documents Relative to the Colonial History of New York,* VII, 889, 890, VIII, 35.

[68] *The Remarkable Case of Peter Hasenclever,* p. 6.

[69] C. S. Boyer, *Early Forges and Furnaces in New Jersey,* pp. 15 ff.

[70] Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Chapter IV. The name of the English works was usually spelled *Coalbrookdale.* T. S. Ashton, *Iron and Steel in the Industrial Revolution,* pp. 26 ff.

[71] Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Appendix.

tion, works were built as far west as Fort Loudon in the Cumberland Valley.[72]

The early Pennsylvania iron industry, like that of other colonies, especially the middle and southern colonies, was organized largely on plantations. Many of the "iron plantations," as they were sometimes called, consisted of several thousand acres of land, and can be compared in many respects with the Virginia tobacco plantations. The mansion house, the homes of the workers, the furnace and forge or forges, the iron mines, the charcoal house, the dense woods which furnished the material for making charcoal, the office, the general store where supplies of all kinds could be obtained, the gristmill, the sawmill, the blacksmith shop, the common bake oven, the barns, the grain fields, and orchards, were part of a very interesting and almost self-sufficing community.[73] Pig iron, bar iron, and castings were hauled from the furnaces and forges in heavy open wagons over tortuous roads to the main highways and thence to the boroughs, towns, or to the capital city, Philadelphia. The close connection between iron making and agriculture during the early period contrasts very strangely with the industrial organization of the present day.

By 1775, ironworks had been established all over Pennsylvania as far westward as the frontier. In addition to furnaces and forges, works of other types developed. According to the returns made in compliance with the terms of the act of 1750, there were two steel furnaces, one slitting mill, and one plating mill in the colony.[74] Although the act provided that works of these types should not be built after 1750, several were established in violation of the law. These will be discussed in another chapter. From about the middle of the eighteenth century, Pennsylvania led all the colonies in the manufacture of iron, and it was during this period when little attention was being paid to

[72] S. G. Hermelin, *Report About the Mines in the United States of America,* pp. 45, 74.

[73] Arthur C. Bining, "The Iron Plantations of Early Pennsylvania," *Pennsylvania Magazine of History,* LVII (1933), 117-137.

[74] Board of Trade Papers: Properties, XVIII, V 72, V 73.

imperial restrictions that the foundations of her later great industrial structure were laid.

Virginia began the smelting of iron about the same time as Pennsylvania. The first successful attempt to produce iron in Virginia was made by Colonel Alexander Spotswood, a distinguished gentleman who had served in the European wars under Marlborough. In the summer of 1710 he arrived at Jamestown as the new Lieutenant Governor of the colony. Immediately on his arrival he threw himself ardently into his work as executive, and by his acts he proved himself to be a far-seeing colonial Governor. In his plans for developing the industrial resources of Virginia, he hoped to establish iron mining "at the publick charge." Failing to secure the consent of the legislature to raise money for opening the iron-ore deposits at the falls of the James River, Spotswood wrote to the Board of Trade asking that the crown take over the mines and use the revenue from the quit-rents to develop them.[75] He tried to show that iron could be sent to England as ballast, making the cost of transportation so slight that the manufacture of iron goods in Virginia would not pay and therefore would not be undertaken. No action was taken by the British government.

After waiting a few years, Spotswood decided to engage in the production of iron himself. About 1719, with the aid of several partners, he built a blast furnace in Virginia.[76] By 1732 there were three blast furnaces and one air furnace[77] in the colony, but not a single forge to refine and hammer the pig-

[75] Alexander Spotswood to Board of Trade, October 24, 1710, *Official Letters of Alexander Spotswood,* Virginia Historical Society, *Collections,* New Series, I, 20-21; also letter of December 15, 1710, *Ibid.,* I, 41.

[76] Journals of the Board of Trade, XXXI, 342-343. Compare with *Ibid.,* XXVI, 217.

[77] J. S. Bassett, (Ed.) *Writings of "Colonel William Byrd of Westover in Virginia, Esq.,"* pp. 344 ff., 374 ff. In 1734 and 1735 Governor Gooch wrote to the Board of Trade that there were four ironworks in the colony employed in running pig iron only, which was sent to Great Britain to be forged. William Gooch to Board of Trade, May 24, 1734, Colonial Office Papers, 5:1323; also letter of July 18, 1735, *Ibid.,* 5:1324. In the letters, mention is also made of Spotswood's air furnace where castings of various kinds were made from pig iron.

iron product of the blast furnaces.[78] This iron was sent to England and to other colonies. Of the works established before 1732, Colonel Spotswood owned the blast furnace at Germanna and the air furnace on the Rappahannock River, five miles below Fredericksburg. He was also one of the partners of the company of Virginians which owned the blast furnace at Fredericksville, thirty miles southwest of Fredericksburg.[79] The Accokeek Furnace was built in 1726[80] by the Principio Company of Maryland on the plantation of Augustine Washington, the father of George Washington. In 1739 there were four blast furnaces, one air furnace, and a forge in operation in Virginia.[81] Among other important ironworks built in the eastern part of the colony before the Revolution, besides those already mentioned, were John Tayloe's Neabsco Furnace and the Occoquan Iron Works in Prince William county. West of the tidewater area, among the eastern spurs of the Blue Ridge Mountains, three furnaces of the Albemarle Iron Company were established.[82]

Farther westward, as frontiersmen pushed into the broad Shenandoah Valley, several ironworks were soon put into operation in that region. The furnaces produced pig iron and also large quantities of pots and pans which Jefferson stated were of unusual toughness.[83] The forges hammered out bar iron which blacksmiths shaped into needed tools, utensils, and articles of various kinds. Prior to the Revolution, works could be found scattered in other sections of the colony. The legislature of Virginia encouraged the establishment of such works in various ways. Ironworkers were not required to work on roads other than those necessary for bringing ore and iron to some

[78] A forge was put into operation by 1736. William Gooch to Board of Trade, May 19, 1736, *Ibid.*, 5:1324.

[79] J. S. Bassett, (Ed.) *Writings of "Colonel William Byrd of Westover in Virginia, Esq.,"* pp. 315, 348, 349, 375; Kathleen Bruce, *Virginia Iron Manufacture in the Slave Era,* p. 12.

[80] Principio Iron Works Papers, Emmet Collection.

[81] William Gooch to Board of Trade, July 3, 1739, Colonial Office Papers, 5:1324.

[82] Kathleen Bruce, *Virginia Iron Manufacture in the Slave Era,* pp. 65-66, 454.

[83] Thomas Jefferson, *Notes on the State of Virginia,* p. 39.

navigable river. Timber on unoccupied lands could be used by the ironmasters to build bridges. Workers were exempted from military service and were also freed from the payment of taxes.[84]

Long before the colonial period closed a few bloomeries had been built among the large deposits of ore in the Carolinas. More than a generation before the Revolution, Carolina iron was sold in the English market. It is true, however, that only small quantities—a few tons—of such iron were sent to England from time to time. It was not until late in the colonial period that blast furnaces were erected in North Carolina, although the legislature made attempts to encourage their establishment.[85] Before 1771 two furnaces were built and put into operation among the great masses of specular ores in the Chatham belt, on the branches of Deep River in Orange county. A third furnace at Salisbury in Rowan county was established about the same time.[86] Thus before the outbreak of the Revolution, the foundations of an iron industry had been laid in North Carolina. Works were also built in South Carolina during the latter part of the colonial period. Buffington's or Wofford's

[84] W. W. Hening, *Laws of Virginia,* V, 137-138.

[85] Geoge Burrington to Board of Trade, February 20, 1731-1732, *North Carolina Colonial Records,* III, 337; A. Dobbs to Board of Trade, January 4, 1755, *Ibid.,* V, 316-317. The Legislature discussed the granting of direct aid to those who would build works. *Ibid.,* VII, 898, 899, 901, 903 ff. *passim,* VIII, 166. With the emergencies brought on by the Revolution, direct financial aid was granted to John Wilcox, who erected a furnace and forge in Chatham county. *Ibid.,* X, 540. In 1777 Wilcox and his partner, William England, sold the works to the state, only to have them returned the following year. *North Carolina State Records,* XI, 387-388, 394-396, 487-488, 544, 575-578, XII, 629, 697-698. Aid was granted to ironmasters during the war by the state when it repaired old roads and built new ones to and from ironworks. Not until 1788, however, was a general law passed "to encourage the building of ironworks." Under the terms of this act, 3,000 acres of vacant land, unfit for cultivation, could be obtained by any who would build works for the purpose of manufacturing iron. The conditions laid down in order to secure such a grant included the stipulation that a specified quantity of iron had to be made within three years after taking up the land. Title would then be given and the land exempted from taxation for a period of ten years. Laws of North Carolina, 1788, c. XXXIV, *Ibid.,* XXIV, 978-979.

[86] Governor Tryon to Earl Hillsborough, February 8, 1771, *North Carolina Colonial Records,* VIII, 496.

Iron Works, built on a stream known as Lawson's Fork, a branch of Broad River, were the largest of these.[87] They played an important part during the struggle with the mother country in making cannon and other supplies of war, but like several other works in this region, and in other parts of the country, they were destroyed by the British before the struggle ended.

In the colony of New York, ironworks were established much later than in the neighboring colonies of Massachusetts, Connecticut, New Jersey and Pennsylvania. No works had been built there by 1734.[88] Before 1750, Philip Livingston erected the Ancram Iron Works, consisting of a furnace and forge. He used the rich ores from his newly discovered mines in Salisbury, Connecticut, as well as New York ores.[89] According to a report made to the Board of Trade in 1750, there was one plating mill in the colony in addition to the Ancram works.[90] In 1751 at Warwick, Ward and Colton built a blast furnace, which later became a part of the important Sterling Iron Works. This industrial establishment made the great chain weighing 180 tons, which was suspended across the Hudson River at West Point, in 1778, to prevent British vessels from sailing up the river. The works were owned at the time by the courageous ironmaster, Peter Townsend.[91] In 1752 Abel Noble established an anchor forge not very far away from Warwick Furnace.[92] In his report to the Board of Trade in 1757, Governor De Lancey stated that the Ancram Works were in full operation,

[87] J. B. O. Landrum, *Colonial and Revolutionary History of Upper South Carolina,* p. 145; J. B. O. Landrum, *History of Spartanburg County* [South Carolina], pp. 153 ff.

[88] Governor Cosby to Board of Trade, January 2, 1734-1735, *Documents Relative to the Colonial History of New York,* VI, 19-20.

[89] Governor De Lancey to Board of Trade, December 1, 1757, *Ibid.,* VII, 335-336. Ores were discovered on a tract of land granted by the colony to Yale College. The tract was transferred to Philip Livingston in 1734, who built a blast furnace at Lime Rock.

[90] *Ibid.,* VI, 604-605; *Documentary History of the State of New York,* I, 729-730.

[91] B. J. Lossing, *Pictorial Field Book of the Revolution,* I, 705-706.

[92] J. H. French, *Gazetteer of New York,* p. 508. Small works had been established in this vicinity before 1745. New Jersey Historical Society, *Proceedings,* Third Series, IV, 69.

but that two furnaces in the manor of Cortlandt and several bloomeries were not working because of the "mismanagement or inability of the undertakers."[93] He made no mention of the Sterling Works, possibly because it was situated on land which was in dispute between New York and New Jersey.[94] In contrast to the flourishing industries of New Jersey and Pennsylvania, only a few works were in operation in New York before the Revolution, although two important ones—Ancram and Sterling —had been established.

The development of the colonial iron industry from the second decade of the eighteenth century down to the Revolution was remarkably rapid. At the close of the colonial period there were more blast furnaces and a larger number of forges in the colonies than in England and Wales combined. The relatively high stage of industrialization reached by the colonists has not been entirely realized by historians. The colonists did not attempt to advertise their industrial activities, nor did many of the Governors inform the British government of the true state of affairs. The reports of almost all the Governors to the Board of Trade, when such reports were sent at all, were inadequate and very incomplete, especially in regard to manufactures. While the Board suspected this and demanded accurate knowledge from time to time, complete information was rarely forthcoming.[95]

A comparison of the iron industry in the colonies with that of the mother country will reveal the strides made by the for-

[93] Governor De Lancey to Board of Trade, December 1, 1757, *Documents Relative to the Colonial History of New York,* VII, 335. These works failed many years before Hasenclever began his enterprises at Cortlandt and were unsuccessful chiefly because of poor ores. See J. B. Pearse, *History of Iron Manufacture,* pp. 48-49.

[94] In 1774, a commission marked the boundary, and decided that the works were in Orange county, New York, and not in Bergen county, New Jersey. *Documents Relative to the Colonial History of New York,* VIII, 337, 349; C. S. Boyer, *Early Forges and Furnaces in New Jersey,* p. 222.

[95] During the difficulties following the enactment and repeal of the Stamp Act, the Board of Trade demanded an exact account of manufactures in the various colonies, and concluded its circular letter to the Governors by asking for an annual account of all new manufactures established thereafter. Board of Trade to the Governors on the Continent of America, August 1, 1766, *Documentary History of the State of New York,* 1, 732.

mer during a short period of time. It is difficult to secure figures showing exactly the extent of the English iron industry for the year 1775, but surveys and estimates of the number of ironworks for years preceding and following that date are available and will give an approximate idea of the status of that industry on the eve of two revolutions—the American Revolution and the Industrial Revolution. From the middle of the seventeenth century or even earlier, the production of pig iron and bar iron was declining, although manufactures of iron products from bar iron were increasing. According to a survey made in 1717, there were sixty-two blast furnaces in England and Wales, having a total capacity of about 18,000 tons.[96] Mushet, quoting a document which he believed to have been written about the time of the financial crisis when the South Sea Bubble burst in 1720, states that there were fifty-nine furnaces in operation with an annual output of 17,350 tons.[97] Scrivenor gives a similar list of fifty-nine furnaces in operation in 1740.[98] From this year to 1775 the industry made little progress, if any at all.[99] Between 1740 and 1775 about a score of new furnaces appeared, but as many, if not more than that number, ceased operation. Most of the losses were in the older iron-producing centers, especially in southeastern England, the trend being toward the concentration of the industry in the Midlands and South Wales.

Authorities are agreed that little advancement was made during the eighteenth century in the production of pig iron in England and Wales until about the year 1775, when technological changes began to revolutionize the industry. The mineral fuel, coke, used successfully by Abraham Darby at the Coalbrookdale Works as early as 1709 for casting pots and other utensils,

[96] *Manuscripts of John Fuller and Son,* pp. 2 ff.

[97] *Papers on Iron and Steel,* p. 43.

[98] *History of the Iron Trade,* p. 57. Mushet was not quite sure about the dating of the document. Scrivenor, a later investigator, on the basis of new evidence placed the date of this source at 1740. The output of bar iron at this time was about 13,000 tons annually, which would coincide with the production of 17,500 tons of pig iron. Compare with *Manuscripts of John Fuller and Son,* pp. 6 ff.

[99] T. S. Ashton, *Iron and Steel in the Industrial Revolution,* p. 60. Compare with E. C. Eckel, *Coal, Iron and War,* p. 9.

and by the second Abraham Darby about 1750 for making pig iron that could be forged into bar iron, was adopted by few ironmasters.[100] The year 1775, however, began a new era in the English iron industry. In this year James Watt "pushed his invention from the experimental to the commercial stage, and began to supply steam-engines for the market."[101] The use of steam to drive the newly invented blowing cylinders for blast, as well as for other machinery,[102] together with the increasing substitution of coke for charcoal and the establishment of new coke furnaces, changed the entire character of the British iron industry and marked the Industrial Revolution, in the production of iron. In 1788 there were seventy-seven blast furnaces in England and Wales.[103] Of these, twenty-four were charcoal furnaces and fifty-three used coke. The charcoal furnaces produced about 13,000 tons of pig iron, while the output of the coke furnaces amounted to a little more than 48,000 tons.[104]

A survey of the iron industry in the colonies reveals a high stage of industrialization reached in colonial America. Before the outbreak of the American Revolution, at least eighty-two charcoal blast furnaces had been built. Twenty had been established in Pennsylvania,[105] seventeen in Maryland,[106] fourteen in Massachusetts,[107] fourteen in Virginia,[108] eight in New Jersey,[109] three in New York,[110] three in North Carolina,[111] two in

[100] T. S. Ashton, *Iron and Steel in the Industrial Revolution,* p. 32 ff. Ashton quotes a letter written by Abiah Darby, the wife of the second Abraham Darby, which gives an account of the first use of coke at the Coalbrookdale Works. Appendix E.

[101] *Ibid.,* pp. 60 ff.

[102] Harry Scrivenor, *History of the Iron Trade,* p. 82; T. S. Ashton, *Iron and Steel in the Industrial Revolution,* p. 37.

[103] Harry Scrivenor, *History of the Iron Trade,* p. 85 ff.

[104] *Ibid.,* pp. 86 f.

[105] Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Appendix.

[106] J. T. Singewald, *The Iron Ores of Maryland,* p. 132.

[107] Colonial Office Papers, 5:889.

[108] Kathleen Bruce, *Virginia Iron Manufacture in the Slave Era,* Appendix, p. 454.

[109] Governor Franklin to Secretary Hillsborough, June 14, 1768, *New Jersey Archives,* First Series, X, 31.

[110] Governor De Lancey to Lords of Trade, December 1, 1757, *Documents*

Rhode Island,[112] and one in Connecticut.[113] Thus the number of blast furnaces in the colonies in 1775 exceeded the number in England and Wales in 1788.

Nor were the British furnaces of 1775 larger than the colonial works. The average output of each English furnace in 1740 was 294 tons of pig iron.[114] The American furnaces produced as much, and such furnaces as Warwick and Reading in Pennsylvania produced 800 tons annually even before the middle of the century.[115] According to the reports of the Governor of Maryland, the furnaces in that colony averaged more than 300 tons annually.[116] By 1788, however, the change from charcoal as a fuel to coke at a majority of the English furnaces, together with changes in technology, brought about a much larger production at these new blast furnaces in Great Britain.[117]

The number of forges in the colonies in 1775 was greater than those of the mother country. According to Mushet there were about 100 forges in England and Wales in 1720.[118] William Rea, a Monmouth ironmaster, testifying before a committee of the House of Commons, stated that of the 125 forges distributed over half the counties of England and Wales in 1737-1738, more

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Relative to the Colonial History of New York, VII, 335-336, 889, 890; VIII, 35.

[111] Governor Tryon to Earl Hillsborough, February 8, 1771, *North Carolina Colonial Records,* VIII, 496.

[112] Colonial Office Papers, 5:1281.

[113] Board of Trade Papers: Proprieties, XXII, Y 17.

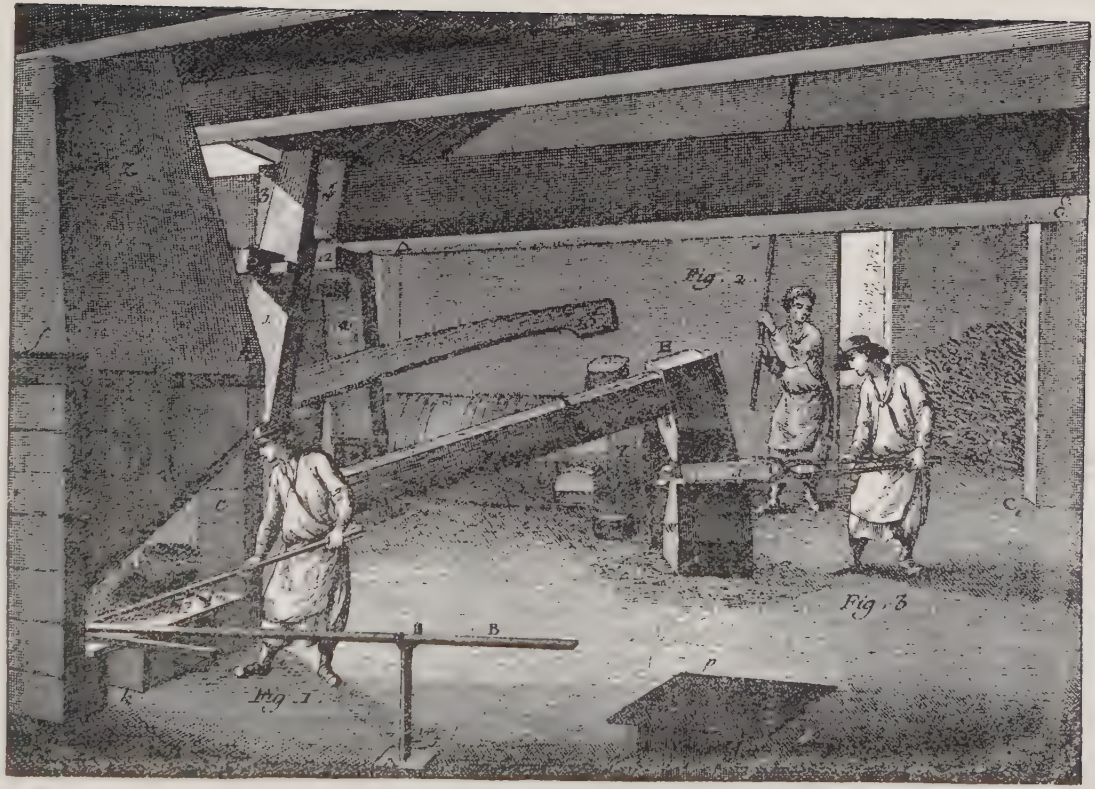
[114] Harry Scrivenor, *History of the Iron Trade,* p. 57. According to the *Manuscripts of John Fuller and Son,* the English furnaces averaged about 300 tons annually.

[115] Israel Acrelius, *History of New Sweden,* p. 168.

[116] Board of Trade Papers; Proprieties, XXI (I), X 8; *Maryland Archives,* XXXII, 24. In "A Short Account of Iron Made in the Colonies of Virginia and Maryland" written some time before 1750 it was estimated that each of the blast furnaces in those two colonies averaged 500 tons annually, Penn MSS, XIII, Document 89.

[117] In 1788 the charcoal furnaces produced an average of 545 tons per annum while the coke furnaces averaged 909 tons. Harry Scrivenor, *History of the Iron Trade,* pp. 86 f.

[118] *Papers on Iron and Steel,* p. 43. Mushet believed that there were sixteen small bloomeries in England at this time which were not included in the list which he used.



THE REFINERY FORGE

than thirty were idle, and those in operation were working at about two-thirds their capacity.[119] A survey of 1747 placed the number of forges at 132, although thirty-six of these were not working.[120] In 1756 and 1757, when the question of throwing open all the ports of Great Britain to the importation of American bar iron duty free was being considered, it was estimated that there were 109 forges in England and Wales.[121] Another important source gives the following comparative list of forges in actual operation:

1717—116 forges
1736— 95 forges
1750— 93 forges

This source states that the capacity of these works in 1717 was about 13,000 or 14,000 tons of bar iron.[122]

It is evident from these surveys and estimates that there could not have been more than 135 forges in England and Wales during this period, whereas there were more than 175 forges in the American colonies. Before the Revolution at least forty-five had been established in Pennsylvania,[123] forty-two in New Jersey,[124] forty-one in Massachusetts,[125] eighteen in Maryland,[126] ten in Rhode Island,[127] besides those in New York, Connecticut, New Hampshire, and Virginia. Many of the forges in the mother country and in the colonies were bloomeries, making bar iron directly from the ore, but most in both countries were refinery forges, using the pig iron produced at the blast furnaces.

The output of American forges—both bloomeries and re-

[119] *Journals of the House of Commons,* XXIII, 109.

[120] M. Postlethwayt, *Considerations on the Making of Bar Iron with Pitt or Sea Coal Fire.* Table facing p. 2.

[121] *Reflections on the Importation of Bar Iron from our Own Colonies of North America,* p. 5.

[122] *Manuscripts of John Fuller and Son,* pp. 6 ff.

[123] Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Appendix.

[124] Governor Franklin to Secretary Hillsborough, June 14, 1768, *New Jersey Archives,* First Series, X, 31.

[125] Colonial Office Papers, 5:889.

[126] J. T. Singewald, *Iron Ores of Maryland,* pp. 128 ff.

[127] Colonial Office Papers, 5:1281.

fineries—was equal to that of the English forges, each producing an average of approximately 150 tons of bar iron a year.[128] With the changes brought about by the Industrial Revolution and the introduction of rolling mills after 1784,[129] the production of English bar iron greatly increased. However, in 1775, the American forges produced much more bar iron than the English forges.

There can be little comparison between the mother country and the colonies in regard to the manufacture of iron articles, including tools and wares of all kinds. By the beginning of the eighteenth century, England was importing from Sweden and other foreign countries thousands of tons of bar iron annually,[130] which, together with the product of British forges, were turned into manufactured goods. Long before the Industrial Revolution, England made and exported to many countries large quantities of iron commodities. In the American colonies, the larger part of all the iron produced at the furnaces and forges was manufactured into tools, implements, and wares, used chiefly by the

[128] The ledgers of colonial ironmasters reveal the amount of iron forged and clearly show that many forges averaged more than 150 tons annually. Potts MSS. This is also borne out by Israel Acrelius, who wrote about the middle of the eighteenth century. *History of New Sweden,* p. 168. The average amount of bar iron produced at Ancram Forge, New York, 1750-1756, was 186 tons. *Documentary History of the State of New York,* VII, 336. S. G. Hermelin, the Swedish investigator, estimated the output of Pennsylvania forges at the time of the Revolution at about 150 tons each, annually. *Report About the Mines in the United States of America,* pp. 72-74. Forges working double-handed made as much as 300 to 350 tons of bar iron a year. Report of Governor Franklin, *New Jersey Archives,* First Series, XXVIII, 247. On the other hand, estimates of the average production at English forges vary from 120 tons in 1720 to 168 tons in 1757. David Mushet, *Papers on Iron and Steel,* p. 43; *Reflections on the Importation of Bar Iron from our Own Colonies of North America,* p. 5.

[129] The inventions of Henry Cort in 1783 and 1784 revolutionized the forging of bar iron by the introduction of rolling mills. Harry Scrivenor, *History of the Iron Trade,* pp. 116 ff.

[130] In 1695, England received about 10,000 tons of bar iron from the continent, chiefly from Sweden. John Houghton, *Husbandry and Trade Improved,* II, 212. By 1775, the amount of iron brought into England from Sweden, Russia, and other countries, had reached a total of between 45,000 and 50,000 tons each year. Harry Scrivenor, *History of the Iron Trade,* Appendix, pp. 325 ff., 339, 343-344.

colonists themselves. The industrial activities of the Americans resulted in the falling off of imports of manufactured iron products from England, although several English writers noted that population was increasing in the colonies which should have resulted in larger exportations of such manufactures from England. This was the chief reason for the attempts made by the British iron manufacturers to restrict the colonists from manufacturing iron beyond the bar-iron stage.

The attempts to control the colonial iron industry were contemporary with the growth of that industry. From the second decade of the eighteenth century, several groups in England continually tried to secure legislation to regulate the production of iron in America. The interests of the various groups conflicted and resulted in a contest that lasted until the colonial period came to a close. Legislation was adopted, but because of the warring factions it could not be anything more than compromise, and therefore could never be very effective. A consideration of the struggle between various English groups to control the colonial iron industry and trade may now be made.

II

THE OPENING BATTLE

> And yet the whole contest in this Affair lies between these two Sets of Men, the *Iron Masters* on one side and the *Iron Manufacturers* on the other: Whereas besides all other Considerations, the *Iron Manufacturers* are to the *Iron Masters* in Number, at least as Two Thousand to One.—*Case of the Importation of Bar Iron,* p. 8.

IT HAS already been pointed out that by the latter part of the seventeenth century the manufacture of iron wares, tools, and utensils, as well as cutlery and nails, in England, had attained relatively large proportions and was increasing, although the production of pig iron and bar iron was decreasing. The metal-working trades thrived because they could use mineral coal as fuel, and were not dependent upon charcoal, as were the declining blast furnaces and forges. By the close of the seventeenth century, iron manufacture had spread over almost all the country, but it remained concentrated to some extent in several districts. The great iron industry of the Weald, in the southeastern part of England, was passing away rapidly. In Monmouthshire and throughout the Forest of Dean many furnaces, forges, and wire mills still flourished. Some of the furnaces in this region made use of the vast quantities of Roman cinders found there. Rich in iron, these cinders bore mute testimony to the extent of iron making during Roman occupation. From this district, British ironmasters during the seventeenth and eighteenth centuries sent their sow iron and pig iron up the River Severn to the forges of Worcestershire, Shropshire, Staffordshire, Warwickshire, and Cheshire, to be hammered into bar iron. After being wrought into iron wares at Dudley, Wolverhampton, Sedgley, Walsall, Birmingham, as well as Sheffield, Bristol, and other places, this iron found its way into all

parts of Great Britain and into various sections of the world.[1]

The iron produced at the furnaces of Worcestershire, Staffordshire, Warwickshire, and Derbyshire, and forged in these counties, was generally "cold-short."[2] It was used, therefore, to a great extent in making nails.[3] The declining forges of Kent and Sussex furnished London with a small proportion of the iron used in its manufactures. While some was also received from the regions of Nottinghamshire and Yorkshire, the metropolis was chiefly dependent upon supplies of Swedish iron. Thousands of tons of foreign bar iron were imported annually,[4] most of which was manufactured in the region of London. The present industrial districts of South Wales and Scotland had not yet developed into centers of the iron trade. The former was slowly, but surely, becoming industrialized; the latter had taken few steps in this direction when the eighteenth century opened.[5]

With the rapid development of the English ironworking trades, the power and influence of British iron manufacturers increased, while the ironmasters—those who owned the blast furnaces and forges—retained the power which they had wielded

[1] Andrew Yarranton, *England's Improvement by Sea and Land,* pp. 56-57. In 1717, there were blast furnaces in the following counties: Berks, Brecon, Carmarthen, Cheshire, Denbigh, Derby, Durham, Flint, Gloucester, Glamorgan, Hereford, Hampshire, Kent, Lancashire, Monmouth, Montgomery, Nottingham, Pembroke, Shropshire, Stafford, Surrey, Sussex, Warwick, Worcester, and York. For the distribution of ironworks in the eighteenth century see *Manuscripts of John Fuller and Son,* pp. 2 ff.; Harry Scrivenor, *History of the Iron Trade,* pp. 57, 85-87; M. Postlethwayt, *Considerations on the Making of Bar Iron with Pitt or Sea Coal Fire,* Table facing p. 2.

[2] Brittle when cold in contrast to "red short" which meant brittle when hot.

[3] Andrew Yarranton, *England's Improvement by Sea and Land,* p. 58.

[4] Harry Scrivenor, *History of the Iron Trade,* Appendix, pp. 325 ff., 339, 343-344.

[5] During the Middle Ages, iron was manufactured in Scotland, but the industry died out before the close of that period. W. I. Macadam, "Notes on the Ancient Iron Industry of Scotland," Inverness Scientific Society and Field Club, *Transactions,* III, 222-263. Accounts of the new works established during the eighteenth century may be obtained in John Sinclair, *Statistical Account of Scotland,* I, 212; III, 334; IV, 331; V, 234, 298; VI, 176; VII, 387, 606; X, 267, 330, 450, 507; XIV, 626; XV, 60; XIX, 93.

for many years.[6] This may be evidenced in the series of measures passed by Parliament for their benefit. In 1690, duties were raised to a high level upon all importations of wrought, unwrought, and cast iron into England from foreign countries.[7] This benefited the owners of the blast furnaces and forges, as well as those who manufactured bar iron into various products, by erecting a tariff wall in their favor. Two years later, the special privilege accorded Ireland of sending iron and iron wares into England free of all duties was withdrawn,[8] although in 1696, for a short time, because of the needs of war, the duties on bar iron, slit iron, and rods imported from Ireland were again removed.[9] In 1694, the prohibition on the exportation of iron which dated back to the reign of Edward III was removed.[10] This permitted ironmasters, if they desired, to send their pig iron and bar iron out of the country.

With the dawn of the eighteenth century, the manufacturers of iron wares in London and other centers became exceedingly aggressive in their demands for legislation to protect their interests. In 1704, the London manufacturers complained to Parliament that manufactured goods from Holland were being sent to the colonies by way of England, thus competing with English goods of a similar sort because of the drawback allowed on the reëxportation of foreign iron wares to the American colonies.[11]

[6] Only a few ironmasters manufactured their iron into finished products, thus controlling the processes from smelting the ores to producing iron wares. Samuel, Aaron, and Jonathan Walker, who became partners of John Crawshaw, were examples of this type. *Journals of the House of Commons,* XXIX, 159-160, 192; T. S. Ashton, *Iron and Steel in the Industrial Revolution,* pp. 46-48.

[7] As early as 1668 the "Company of Blacksmiths" petitioned Parliament for the free importation of Swedish iron because of its superiority to English iron. The ironmasters of Sussex strongly opposed. Historical Manuscripts Commission, *Twelfth Report,* Appendix, Part VII, p. 55. The additional duty imposed in 1690 amounted to £1 13s. 0d. a ton on all types of iron and iron manufactures if carried in foreign vessels and £1 3s. 0d. a ton if brought in British vessels. 2 William and Mary, c. 4.

[8] 4 William and Mary, c. 5, section 2.

[9] 7 and 8 William, c. 10, section 17.

[10] 28 Edward III, c. 5; 5 William and Mary, c. 17.

[11] *Journals of the House of Commons,* XIV, 362.

Parliament immediately replied by abolishing the drawback.[12] Five years later, led by Sir Ambrose Crowley of Newcastle[13] and other prominent men, the manufacturers asked that the drawback on iron and steel bars reëxported from England be removed. They pointed out that shipments of unwrought iron in the form of bars stimulated the growth of iron manufactures in the colonies. It was shown that large quantities of iron and steel were manufactured in America and that there was no drawback on manufactured iron and steel exported from Great Britain, even though made from foreign iron; therefore colonial manufactures had the advantage over English goods of a like nature to the extent of more than £15 per ton.[14] Parliament again responded by granting the demands of the manufacturers.[15] Since the Americans could buy only through England, they were now obliged to pay a high price for Spanish or Swedish bar iron, a price which included the high British duties.

The years following the signing of the Treaty of Utrecht mark the beginning of the period in which the colonial iron industry rapidly expanded. About this time when the fires of new furnaces and forges were being lighted in Maryland, Virginia, Pennsylvania, New Jersey, and also in New England,[16] a set of factors gradually appeared which brought the developing industry in the colonies clearly to the attention of British ironmasters, iron manufacturers, merchants, and shippers, and revealed a variety of interests between these groups which conflicted in many respects. The ironmasters soon saw that the colonists, if permitted

[12] 2 Anne, c. 9.

[13] Sir Ambrose Crowley was an early example of an industrial leader who had risen from obscurity. Beginning as a Greenwich blacksmith and ironmonger, he established small works in Sunderland in 1682, and from that time on raised himself to wealth and influence. He built refinery forges and ironworks of various kinds near Newcastle. He was knighted in 1707 and died in 1713.

[14] Journals of the Board of Trade, XXII, 173-174; *Journals of the House of Commons,* XVI, 179, 502; *Calendar of State Papers: America and West Indies,* 1710-1711, pp. 333-334.

[15] 9 Anne, c. 6; Journals of the Board of Trade, XXII, 219, 220; *Calendar of State Papers: America and West Indies,* 1710-1711, pp. 355, 360.

[16] See Chapter I.

to continue the establishment of ironworks, might become serious competitors in the production of pig iron and bar iron, and therefore they demanded high duties on the importation of colonial iron. Those in England who manufactured iron products from bar iron looked forward to obtaining such iron as they needed from the colonies at cheap prices, and therefore favored the manufacture of colonial iron as far as the bar-iron stage, but no farther. It was natural that this group should also want the manufacture of all iron wares in the colonies suppressed, thus eliminating all competition there. Merchants of all kinds, together with the shipping interests, desired that colonial iron be admitted duty free into Great Britain, for British merchandise could be exchanged for it, and commerce given an impetus.

It is true that the exigency of the European situation was a factor in bringing about the struggle between the various groups over the question of colonial iron. One of the incidents that brought out the fact of a rapidly developing iron industry in the American colonies was connected with Sweden. During the last months of 1716 and early in 1717, Great Britain was threatened with danger from that country. News had come that Sweden was designing to raise a "Rebellion in his Majesty's Dominions to be supported by a Force from *Sweden.*"[17] Charles XII was engaged at this time in the Northern War against Prussia, Saxony, Denmark, Hanover, and Russia, a coalition which aimed at driving him from the territories along the southern and eastern shores of the Baltic. In the years preceding the war, and during the war, many British merchant vessels had been seized and held in Swedish ports,[18] the treaty of mutual defense made between England and Sweden in 1700[19] had been constantly violated,[20] and "British rebels" (Jacobites) had been given refuge in Sweden.[21] The ac-

[17] *Journals of the House of Commons,* XVIII, 474. This was a part of the plan of Baron Görtz for an alliance with English Jacobites whereby Swedes and Jacobites would land in Scotland for an attack upon England. See "Papers Relative to the Intended Invasion from Sweden," W. Cobbett, *Parliamentary History of England,* VII, 396-421.

[18] *Journals of the House of Commons,* XVIII, 750.

[19] *Ibid.,* XVIII, 526 ff.

[20] *Ibid.,* XVIII, 750; *Letter to a Member of Parliament Concerning the Naval Store-Bill,* p. 9.

[21] Adam Anderson, *Origin of Commerce,* III, 75.

cession to the throne of England in 1715 of George, Elector of Hanover, a member of the anti-Swedish league, brought the war close to Britain. Attempts had been made by Englishmen, before and after George I became king, to settle the difficulties with the northern country, but no satisfactory agreement could be reached.[22] An act was passed by Parliament which empowered the king to prohibit all trade with Sweden.[23] A proclamation to this effect followed in March, 1717.

The royal proclamation cut off the Swedish supply of iron and soon caused a scarcity of that much-needed commodity.[24] Petitions were sent to Parliament from ironmongers, iron manufacturers, smiths, merchants, dealers, and traders in ironware of London,[25] Birmingham,[26] Bristol,[27] Ipswich,[28] and Hallamshire,[29] stating that the restrictions on commerce with Sweden were ruining their industry, that many were out of work, that thousands were in danger of losing their means of livelihood, and asking that relief be granted, especially that the prohibition of imports of Swedish iron be immediately taken off. In several of the petitions it was suggested that as it was known there was much iron ore in the American colonies, encouragement should be given to Englishmen who would be willing to erect ironworks there, thus developing the industry in the colonies and rendering England forever independent of the Swedish supply.[30] The British forge masters, who were profiting by the high prices of bar iron during this period, iron having advanced from £16 to £24 and more a ton, sent in petitions opposing any assistance by Parliament to those willing to set up works in the colonies.[31]

The scarcity of bar iron did not last long. Swedish iron was imported into England by way of Holland and the "East Coun-

[22] *Journals of the House of Commons,* XVIII, 750.
[23] *Ibid.,* XVIII, 477, 478, 480, 481, 482, 486; 3 George I, c. 1.
[24] Adam Anderson, *Origin of Commerce,* II, 70.
[25] *Journals of the House of Commons,* XVIII, 691, 745.
[26] *Ibid.,* XVIII, 747.
[27] *Ibid.,* XVIII, 749.
[28] *Ibid.,* XVIII, 746.
[29] *Ibid.,* XVIII, 745. Hallamshire was the name given to the region around Sheffield.
[30] *Ibid.,* XVIII, 691, 747, 749.
[31] *Ibid.,* XVIII, 733.

try."[32] The Dutch who carried it, however, charged a premium of £4 a ton for their services, which naturally sent the price of iron soaring in Great Britain.[33] In December 1718 the impetuous and energetic Charles XII perished on the field of Frederikshald. Following a revolution, Ulrica Eleanor, the sister of Charles, became queen by election after her abrogation of all autocratic privilege and hereditary right; hostilities on the part of England came to an end, and Swedish iron once again found direct entry into England.[34] The difficulties with Sweden showed clearly the uncertainty of depending upon that country for supplies of iron, as well as for naval stores, and made more imperative than ever the necessity of developing colonial resources.

During the period of embargo on Swedish iron many attempts were made to get Parliament to assist in establishing ironworks in the American colonies. For the first time it became generally known that furnaces and forges were already established there. Not only this, but quantities of iron and steel were sent to the colonies from England and made into tools and implements. According to a statement rendered to the Board of Trade, about 1,960 tons of iron and more than 707 tons of steel had been sent from foreign countries through England to the plantations during the period 1701-1710 to be manufactured.[35] The fact that

[32] Harry Scrivenor, *History of the Iron Trade,* Appendix, p. 327. The *East Country* was the region between the Oder and the Gulf of Finland.

[33] This fact was brought out early in 1718 during the debates in Parliament over the prohibition of trade with Sweden. W. Cobbett, *Parliamentary History of England,* VII, 549-550; J. F. Chance, *George I and the Northern War,* p. 253.

[34] Public sentiment in England opposed the interruption of trade with Sweden. On the advice of Earl Stanhope, the head of the cabinet, the prohibition was removed on April 4, 1719, instead of waiting for the lapse of the proclamation at the end of the session. *Ibid.,* p. 304.

[35] Board of Trade Papers: Plantations General, IX, K 7; *Calendar of State Papers: America and West Indies,* 1710-1711, p. 342. The law of 1710 removing the drawback (9 Anne, c. 6) had the desired result of reducing the importation of iron and steel into the colonies for the time being. The colonists, however, continued to import both iron and steel from Great Britain down to the outbreak of the Revolution. House of Lords MSS., No. 185; *Journals of the House of Commons,* XXIII, 113; S. G. Hermelin, *Report About the Mines in the United States of America,* pp. 11, 16.

the British plantations in America were taking steps toward industrialization was impressed upon the minds of many Englishmen by the first shipment of colonial bar iron to Great Britain in 1718, a few tons being sent from Maryland.[36]

Another factor which brought the colonial iron industry to the attention of the mother country came from the colonists themselves. Early in 1716, before the Swedish embargo, New England merchants presented a memorial to the Board of Trade asking that encouragement be given to naval stores of various kinds, and in the case of those already receiving a bounty, that they be continued and increased.[37] For the next few years colonial agents, representatives, and others interested in the colonies were busy sending memorials to the Board of Trade, also asking that bounties be granted on timber, pipe and barrel staves, hemp, rosin, turpentine, cordage, and iron.[38] Colonial agents and others appeared personally before the Board to answer questions.[39] In memorials and petitions, they asked that pig iron and bar iron from the colonies be freed from all duties and even granted premiums.[40]

The most persistent petitioner at this time was Joshua Gee, one of the mortgagees to whom William Penn pledged his lands in Pennsylvania. This colony was just beginning to establish ironworks, and Gee appeared to be very anxious for the rapid development of the industry there. He testified often before the Board. William Byrd also appeared and plead on behalf of Virginia. The Board received these requests favorably. Its *Representation* of 1717 to the Crown stated that it was quite evident that iron from the plantations was as good as Swedish iron. The

[36] House of Lords MSS., No. 185; Harry Scrivenor, *History of the Iron Trade,* Appendix, p. 328.

[37] Journals of the Board of Trade, XXV, 332; Adam Anderson, *Origin of Commerce,* III, 68.

[38] Board of Trade Papers; Plantations General, IX, K 78, K 79, K 134, K 136; X, L 24.

[39] Journals of the Board of Trade, XXVI, 193-194, 195, 205, 208, 209, 212, 215, 220, 221. Many Englishmen, including Sir Thomas Johnson a member of Parliament from Liverpool, also appeared before the Board, advocating aid for the development of colonial resources.

[40] *Ibid.,* XXVI, 205, 209, 212, 214, 215, 221.

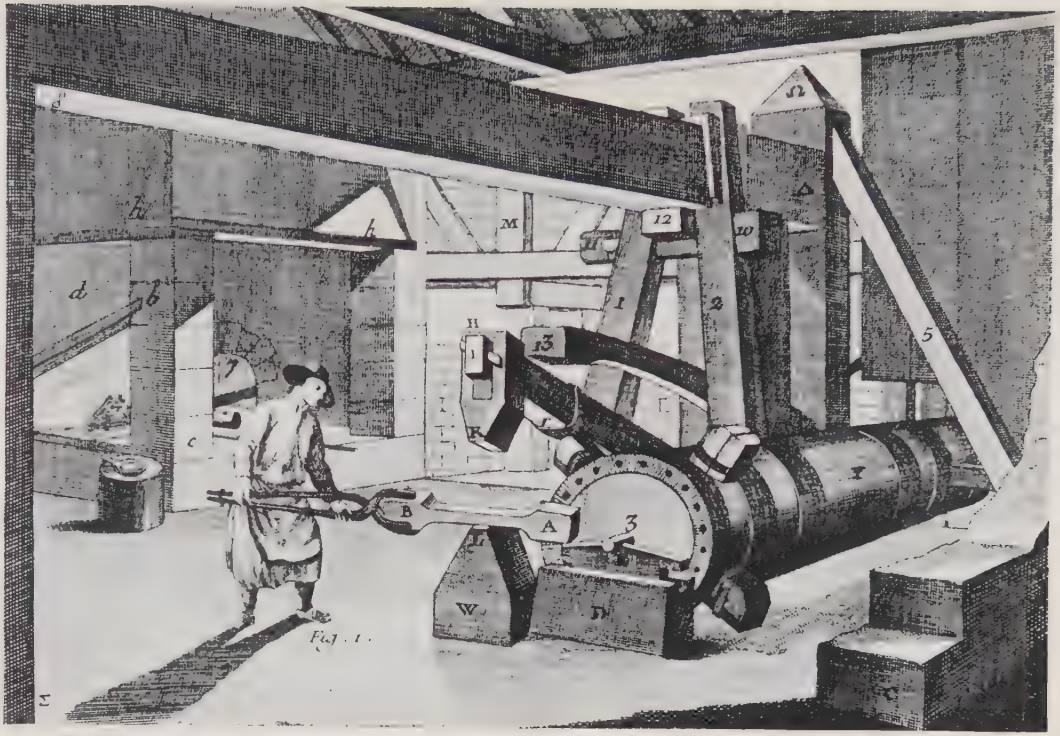
Representation continued: "As the expence of the erecting of forges and other conveniences for that work, and of sending over skilful workmen will be very great, it has been propos'd to us that a praemium of £3 pr. ton on bar or hammer'd iron, and 30 sh. upon cast iron duty free, be allowed by Parliament for the term of 20 years upon all iron imported from thence. This we conceive not improper to be granted provided there be due restrictions to prevent their interfering with the manufacture of wrought iron in Great Britain. And in this case we likewise submit to your majesty whether it may not be proper to allow the inhabitants to pay their taxes and quit-rents to the Crown in iron."[41] No definite action, however, was taken to aid the colonial iron industry, although the Swedish supply was cut off at this time.

While colonial agents and others were seeking aid in England, attempts were being made in the colonies to encourage the industry there. In July 1718 Massachusetts provided that bounties should be paid for a period of ten years on the production of bar iron, rod iron, scythes, nails, and hollow ware, within the colony.[42] In New York about the same time it was proposed that paper money be issued and loaned at the rate of five per cent to ironmasters, repayment of which could be made in the form of iron which they made.[43] In 1719 an act was passed by the legislature of Maryland which was definitely planned to aid the development of industry there. The rights of the proprietor to royalty on minerals were wiped out, and grants of unoccupied

[41] *Ibid.*, XXVI, 222, 224, 226; *Calendar of State Papers: America and West Indies*, 1716-1717, pp. 278-279.

[42] It was provided that £2 per ton should be paid on bar iron "equal to *Spanish*," providing that the forge made thirty tons annually, while £3 per ton should be given on all bar iron made at each forge in excess of thirty tons a year. The bounty on rod iron amounted to £5 per ton, 1s. 8d. per 1,000 on twentypenny nails down to 3d. per 1,000 on threepenny nails, 12s. 0d. per dozen on scythes three feet nine inches long if equal to the best imported from Great Britain, and £2 per ton on all cast-iron hollow ware if equal in quality to English or Dutch wares. House of Lords MSS., No. 86; *Massachusetts Journals of the House of Representatives*, II, 6, 18, 20, 26, 41, 66; *Journal of the House of Commons*, XXIII, 115.

[43] *Ibid.*, XXIII, 115.



FORGING AN ANCONY AT THE REFINERY FORGE

lands could be secured by those setting up ironworks.[44] In Pennsylvania also, the proprietors aided ironmasters with gifts of land.[45]

In December 1718 Joshua Gee presented another memorial to the Board of Trade, relating to the trade in iron and timber between the Dominions of the Northern Crowns and Great Britain, and asking that encouragement be given to import these products from America.[46] Gee, Astell, and others appeared before the Board and asked that a bounty, equal to the duty on iron from the plantations, be allowed for a period of thirty-one years.[47] The entire subject of naval stores was discussed, and the Board expressed itself in favor of allowing colonial pig iron and bar iron to be imported free of all duties.[48] The danger of permitting the colonists to manufacture their bar iron into iron products was pointed out, and it was suggested that in order to keep labor scarce in works where iron wares and tools were manufactured, negroes be prohibited from employment in such works.[49] The Board did not go any further into the matter, because at this time the discussion of granting additional encouragement to colonial naval stores was begun in Parliament.

Stressing the dependent position of England upon Sweden for a supply of bar iron, English merchants trading with Virginia and New England petitioned Parliament before the Naval Stores Bill came up in 1719, and also in 1720 after the bill had failed, for the free importation of pig iron from the plantations. They hoped that such action would encourage the development of that branch of the iron industry in the colonies and thus enlarge their carrying trade. The petitions were opposed by the Massachusetts interests. Jeremiah Dummer, the Massachusetts colonial agent in London, wrote that Parliament would not encourage the making of pig iron in the colonies without restricting iron

[44] *Laws of Maryland,* 1719, c. 15.
[45] Montgomery MSS.
[46] Journals of the Board of Trade, XXVIII, 54.
[47] *Ibid.,* XXVIII, 59.
[48] *Ibid.,* XXVIII, 63 ff.
[49] *Ibid.,* XXVIII, 97-98.

manufactures in some way.[50] The secret of the opposition of Massachusetts lay in the fact that such manufactures were already rapidly developing in that colony and throughout New England.

Many other petitions to Parliament preceded the introduction of the Naval Stores Bill in 1719. The ironmasters and ironworkers in many parts of England asked that no encouragement be given to any kind of iron from America.[51] The petitioners pointed out that the iron trade was England's greatest industry with the exception of the manufacture of woolens, and that it maintained at least 200,000 people. They stated further that if a bill was passed which aided American iron producers, it would ruin the English iron industry, and would affect many classes of people including ironmasters, mine owners, ironworkers and owners of forests which supplied the wood for making charcoal.

On the other hand, the merchants and traders to America, as well as the mercantile interests in general, favored the encouragement of the importation of American iron, since iron was

[50] After the bill of 1719 had failed, Dummer wrote: "The Virginia merchants, who petitioned the parliament last year for the free importation of iron from the plantations, have done the same this session. They have indeed made a show of putting other naval stores, as timber, hemp and flax, in their petition; but the principal thing they aim at is iron, notwithstanding they know the parliament will not encourage the making that ore among us without discouraging at the same time our iron manufactures. . . . These merchants think they shall get money by importing pig iron from Virginia, which consideration is so prevalent, that they care not what distresses they bring upon the poor inhabitants of the country. They would be well enough content to see us reduced to the servile condition of the Jews, when under the tyranny of the Philistines, who were not permitted to have a smith throughout all their land. . . . The traders to Virginia, finding themselves frustrated in what they mainly, and I may say only, intended, are at work with their friends in the house of commons, to move that it may be an instruction to the committee, to receive a clause for the free importation of iron. I shall oppose this clause all I can, for fear of the consequences of it; and if I an't able to carry my point, then I shall endeavor to prevent the laying any prohibition upon our working iron; and if I fail in this too, then I must do as I did the last session—desire to be heard at the lords' bar before the bill pass." Letter of Jeremiah Dummer, April 8, 1720, *Hutchinson Papers,* Massachusetts Historical Society, *Collections,* Third Series, I, 140-141.

[51] *Journals of the House of Commons,* XIX, 118.

needed, they averred in their petitions, for navigation, naval purposes, and for secondary manufactures.[52] From this time on for many years these groups were extremely active in attempting to persuade Parliament to remove the duties from colonial iron because they believed that it would stimulate commerce with the colonies.

Early in 1719 the bill known as the Naval Stores Bill was passed by the House of Commons. A clause provided that there should be no duties on sow iron and pig iron from the colonies.[53] The influence of the English forge owners, who made bars from pig iron, played an important part in bringing this about. Acceding to the requests and petitions of the London manufacturers, the bill contained another clause which would have prohibited the making of any kind of secondary iron products in the colonies:

> That no Person or Persons within the said Plantations, or any of them, shall manufacture any Iron Wares of any kind whatsoever, out of any Sows, Pigs, or Bars whatsoever.[54]

The House of Lords rejected this clause after receiving the bill, and substituted another which provided;

> That from and after the 25th. day of *December,* 1719, no Forge going by Water, or other Work whatsoever, shall be erected or kept up in any of the said *British* Plantations, for the making, working, or converting any Sows, Pigs, or cast Iron, into Bar or Rod Iron.[55]

The clause in the bill as it passed the House of Commons would have prohibited all secondary iron manufactures in the colonies. The clause as changed by the House of Lords[56] went much further and would have even prevented the manufacture of bar iron at the forges as well as slit or rod iron at the slitting mills. If the bill had passed in this form, only pig iron and cast iron could have been made in the plantations. The amended bill was re-

[52] *Ibid.,* XIX, 116.

[53] *Ibid.,* XXII, 851; Board of Trade Papers: Plantations General, X, L 22.

[54] *Letter to a Member of Parliament Concerning the Naval Store-Bill,* p. 12.

[55] *Ibid.,* pp. 12-13.

[56] *Journals of the House of Lords,* XXI, 124.

turned to the House of Commons,[57] but no further action was taken on it. The members of both Houses wanted more time to consider it.

The bill failed on account of the conflict of interests and because of the influence exerted on the members of Parliament by the different groups. The furnace owners and ironmasters who were interested chiefly in the production of pig iron opposed very vigorously the clause which removed the duty from colonial pig iron.[58] The clauses restraining colonial iron manufactures and even the production of bar iron, which clearly show the influence of English iron manufacturers and forge masters upon Parliament, also played a part in defeating the bill. Several writers believed that these clauses alone were responsible for killing the bill. Joshua Gee exclaimed: "These clauses were thrust in by the private views of some ironmasters who had not consideration enough to think of the true interest of their country."[59] Another writer concluded that these restrictions would have entirely ruined the iron industry in the colonies, and that after being duly considered by Parliament, "those Persons that were solicitous for the benefit of the Publick, desir'd the Bill should be dropt that Session. . . ."[60] Others also believed that the restraints would amount to an attack on the "liberties of mankind."[61]

The question arises as to how far the exigencies of the European situation affected the action taken on the bill. It is true that the foreign situation in 1717, when the embargo on Swedish commerce went into effect, was a reason given by several groups

[57] *Ibid.*, XXI, 128.

[58] *Letter to a Member of Parliament Concerning the Naval Store-Bill,* p. 12; Adam Anderson, *Origin of Commerce,* III, 89.

[59] Board of Trade Papers: Plantations General, X, L 24.

[60] *Letter to a Member of Parliament Concerning the Naval Store-Bill,* p. 13.

[61] One of the writers who took this attitude wrote: "If such a Prohibition be thought just to prevent the Plantations from interfering with the Iron-Workers in this Kingdom, all other Tradesmen may expect, in their Turns, to be forbid Working at their respective Callings. For, by the same Reason, the people may be forbid making Cheese or Cyder, for fear of prejudicing the Manufacturers in Cheshire and Herefordshire." *Reasons against a General Prohibition of the Iron Manufacturers in His Majesty's Plantations,* reprinted in American Historical Association, *Annual Reports,* 1892, p. 56.

for their demand that Parliament aid the production of American pig and bar iron. The fact that relations with Sweden were fairly satisfactory again in 1719, and that trade was resumed with that country, might have influenced some members of Parliament to vote against a final consideration of the bill after it had been returned from the House of Lords to the House of Commons, in order to creep out of a difficult situation. Accounts of contemporaries, however, show clearly that the struggle over the clauses restraining colonial iron manufactures was the chief factor in preventing the final passage of the bill.

Agitation continued after the bill of 1719 had been put aside, especially on the part of merchants and traders to America who wanted the duties on colonial iron removed. They held that many vessels were obliged to return to Great Britain from the colonies "dead freighted," and many remained a long time in America waiting for the next crop of tobacco, sugar, and other products. If encouragement were given to the importation into England of timber and iron, it was argued that vessels would be sure of a cargo, and in return the inhabitants of the colonies would buy British manufactures of all kinds, thus being diverted from further attempts of manufacturing articles which interfered with those of the mother country.[62] They also held that if care were not taken to preserve the timber which was being used up by the furnaces, there would not be enough oak left to supply the Royal Navy, or for shipping and navigation.[63] Thus they favored even the restriction of the number of English furnaces and forges. Attempts were continued in Parliament for action in granting further premiums on colonial naval stores,[64] and in 1722 an act was passed giving additional encouragement to certain kinds of naval stores from the colonies.[65] Iron, however, was not included.

While extreme agitation for the regulation of the colonial iron

[62] Joshua Gee, *Trade and Navigation of Great Britain Considered,* pp. 79 ff; *Letter to a Member of Parliament Concerning the Naval Store-Bill,* p. 11; Adam Anderson, *Origin of Commerce,* III, 89.

[63] *Letter to a Member of Parliament Concerning the Naval Store-Bill,* p. 17.

[64] *Journals of the House of Commons,* XIX, 281, 316, 669, 704.

[65] 8 George I, c. 12.

industry died down for the time being, the various interests waited for conditions which would favor the renewal of the struggle. During the decade of the twenties, small amounts of pig iron were shipped for the first time from the colonies to Great Britain. Governor Spotswood of Virginia was one of the pioneers in shipping pig iron to the mother country. Partly through the efforts of Spotswood and Byrd of Virginia,[66] colonial pig iron was rated at one pound per ton, which meant a duty at the prevailing rates of 3s. 9½d.[67] This was an exceedingly low duty.[68] Because of the high tariff barriers on iron from foreign countries, only bar iron was imported into England from Sweden, Russia, and elsewhere. The exceedingly high tariff on pig iron from foreign countries was prohibitive. If carried in British vessels, the duty on all iron brought from foreign countries amounted to £2 1s. 6d. per ton; if brought in foreign vessels a duty of £2 10s. 10d. was imposed.[69] After the small shipment of bar iron from Maryland in 1718, England did not receive any bar iron from the American continental colonies until 1726. From this time on, small amounts of colonial bar iron reached the mother country. It was rated the same as bar iron from foreign countries, paying the same high duty of £2 1s. 6d. per ton.[70]

After the struggle of 1719 was over and the clauses intended to regulate the colonial iron industry had been removed from the Naval Stores Bill, the Board of Trade made a report to the Crown on general conditions in the colonies.[71] It stated that iron abounded in most of the plantations. To solve the problem of payment for English goods, which continually faced the colonists, the Board suggested that Parliament enact legislation to en-

[66] Journals of the Board of Trade, XXVI, 217; XXXI, 342-343.

[67] *Journals of the House of Commons,* XX, 396; 11 George I, c. 7; Henry Saxby, *British Customs,* p. 179.

[68] Spotswood was not satisfied even with the low duty, but continued to write to the Board of Trade asking that the entire duty be taken off importations of colonial pig iron. Board of Trade Papers: Plantations General, X, L 87 and 88.

[69] Henry Saxby, *British Customs,* p. 179.

[70] *Ibid.,* p. 178.

[71] "State of the British Plantations in America, 1721," *Documents Relative to the Colonial History of New York,* V, 591 ff.

courage the production of naval stores and minerals in America. "It is therefore," said the Board in referring to the development of colonial manufactures which competed with those of Great Britain, "to be presumed that necessity and not choice has put them upon erecting manufactures, not having sufficient commodities of their own to give in exchange for those they do receive already from Great Britain; and the most natural method of curing this evil would be to allow them all proper encouragement for the importation of Naval Stores and minerals of all kinds." The extent of colonial iron manufacture was minimized, the Board averring that only small quantities were made at colonial ironworks and that British iron "being esteemed better, it is generally used in their shipping."[72]

Throughout the seventeenth century the colonies were generally regarded by most Englishmen as parts of British territory where supplies, chiefly raw materials which England did not produce herself, could be obtained. During the eighteenth century, especially after the Treaty of Utrecht had brought the War of the Spanish Succession to a close, the plantations came to be prized as markets for English manufactured goods in addition to being reservoirs of raw materials. The northern colonies in particular also came to serve another purpose in the empire —that of supplying the British West Indies and other island colonies, especially the Sugar Islands, with flour, bread, fish, cattle, horses, timber, lumber, and staves for making casks and barrels. This fitted in with British ideas about the value and utility of the colonies. But English manufacturers felt it imperative to keep the colonies from manufacturing the goods and commodities which they themselves could produce. It was partly for this reason that the policy of granting bounties on naval stores was inaugurated in 1705. The arguments for such a policy of developing colonial resources were set forth by the Board of Trade from time to time and may be summarized as follows: (1) to secure materials from the colonies in payment for English goods; (2) to prevent the exportation of England's coin and bullion to foreign countries in payment for foreign supplies; (3)

[72] *Ibid.*, V, 598 ff.

to free Great Britain from dependence upon the northern countries for naval stores and other supplies; (4) to turn the attention of the colonists away from manufacturing, and (5) to aid and encourage British shipping. All attempts designed to prevent the development of colonial industry and manufactures, however, whether by encouragement to the production of naval stores or by such restrictive legislation as that directed against the manufacture of woolen cloth and beaver hats, were bound to fail, not only because the northern colonies were so much like the mother country in natural resources and climate, but also owing to the great distance which separated the two countries.

III

THE CONFLICT BETWEEN GROUPS

> With the generality of mankind . . . a principle of self interest is the ruling motive of action.—W. Kenrick, *Address to the Artists and Manufacturers of Great Britain,* p. 19.

From the time of the failure of the attempts to regulate and control the colonial iron industry in 1719, many mercantilists continually and insistently advocated aid to the industry in some form or other in order to encourage the production of pig iron and bar iron. They pointed out and emphasized the advantages of overcoming England's dependence upon foreign countries for iron by obtaining it from the colonies. Besides William Byrd, Alexander Spotswood,[1] Joshua Gee,[2] Joseph Boone, and Richard Berresford,[3] there were many other staunch supporters of the mercantile theory who demanded that naval stores and iron be secured from England's possessions overseas.

Sir William Keith, Governor of Pennsylvania, who appealed to the Board of Trade in 1717 for aid in developing the iron resources of that province,[4] and who lost a great deal of money in ironworks which he established near the Delaware River,[5] again presented strong mercantilistic arguments to the Board of Trade in 1728. In his "Short Discourse on the Present State of the Colonies in America with Respect to the Interest of Great Britain," he urged the policy of fostering in the colonies such industries as did not conflict with those of Great Britain. He

[1] Journals of the Board of Trade, XXVI, 217, XXXI, 342-343; Board of Trade Papers: Plantations General, X, L 87 and 88.

[2] Journals of the Board of Trade, XXXI, 293-294; Board of Trade Papers: Plantations General, X, L 24.

[3] Board of Trade Papers: Proprieties, X (I), Q 111, Q 113.

[4] *Ibid.,* X (I), Q 140.

[5] William Keith, *Just and Plain Vindication,* pp. 7-8; James Logan, *A More Just Vindication of Sir William Keith,* p. 3; Emanuel Swedenborg, *Regnum Subteranneum sive Minerale de Ferro,* Part I, Section 13.

stated that Great Britain could reduce her balance of trade with Russia and the Baltic by aiding the colonists in the production of masts, timber, hemp, flax, pitch, tar, rosin, copper ore, pig iron, and bar iron.[6] In 1738, in the midst of the second struggle for the regulation of the colonial iron industry, he wrote:

One would think that the Articles on the Custom-house Books of the vast Quantities of Iron, that are yearly imported into *Great Britain* from the *Baltic, Russia,* and *Spain,* would be sufficient to convince every one of the Necessity that urges *Great Britain* to encourage the Manufacture and Importation of that Commodity in and from her own Plantations; which would greatly lessen, if not in time totally prevent, the yearly Remittance of a large Balance in ready Cash to these Foreign Countries; but this laudable Design, tho' often attempted, has unfortunately been obstructed hitherto, by the private Interest of a few, who happen to be concern'd in the Forges and Bloomeries that yet remain in *England,* notwithstanding they are now carried on at a larger Expence, and with much more Difficulty than formerly, and likewise consume great Quantities of Wood that we can but ill spare. How long those private and particular Interests may still prevail, to the Discouragement of so great a public Good, is uncertain; but we presume to affirm that there is not any Proposition in Trade more demonstrable, than that the *British* Plantations in *America,* with very small Encouragement, can afford any Quantity of Iron of an equal good Quality with that which is imported from the above Countries, and at as cheap a Rate as it comes from thence to be sold in *England.*[7]

John Oldmixon was another mercantilist, who had traveled through the colonies and knew conditions there as well as in England. Quoting a contemporary, he wrote:

How much our Trades near home have been considered to the Disadvantage of our Colony Trades, appears particularly in an Instance which has lately happened. It is not doubted but that there is enough Iron Ore or Stone in our Northern *American* Continent Colonies to answer the Demand of the *British* Iron-Trade, if Encouragement were given for making Iron there and importing it thence; but the Influence of the *Baltick* Traders and the Iron Traders in *England,* is such a Clog to that Use and all necessary Experiments, that so great Store of Iron which might be brought thence, lies among the Rubbish of the Earth.

And if Pig and other unmanufactured Iron was imported from thence to *England,* it would not only in a great Measure prevent the Waste of our remaining Woods by its Forges; but being brought

[6] Board of Trade Papers: Plantations General, X, L 105.

[7] William Keith, *History of the British Plantations in America,* p. 182.

home as Ballast for Ships, or at low Freight, would come so cheap to our Workers and Dealers in Hard-ware (a very numerous and profitable Body of People) that the Trade would be prodigiously increased, and consequently, not only their private Gains, but the publick Stock of the Nation; all which is too easily to be conceived to need Enlargement here. But it must be added farther, that there would be a saving to the Nation of 2 or 300,000 l. a Year, which the *Swedes* have had against us in the Balance of the Iron Trade for many Years past.[8]

Many other mercantilists set down their arguments in the pamphlets which were so plentiful during this period.[9]

In the colonies many hoped that Great Britain would take some steps to aid the colonial industry. For example, Governor Gordon of Pennsylvania pointed out the difficulties that confronted the colonists in paying for English goods and manufactures. He suggested encouragement be given to producers of hemp and iron. "It has been thought," he wrote the Board of Trade in 1731, "that Iron would be a more certain Return, but those concerned in these expensive Works have from the Lowness of the Price in Britain been disappointed in their Expectation."[10] Again in 1735 he wrote that it was generally conceded colonial iron was as good as Swedish, but that without encouragement, "the great Expense that attends Works of that kind in a Country where Labor is so dear has given no small Damp to these Undertakings."[11]

While mercantilists were clamoring for aid to produce iron in the colonies, the British forge owners exerted sufficient influence upon Parliament in 1729 to have that body act in their favor when a bill was being drawn up which aimed at the preservation of mast pines in the colonies. One of the clauses in this bill provided that all forges in the colonies should be destroyed and that no new ones should be set up.[12] This clause was as dras-

[8] John Oldmixon, *British Empire in America* (1741 Edition), I, xxix-xxx.

[9] Adam Anderson, *Origin of Commerce,* III, 217; David MacPherson, *Annals of Commerce,* III, 214.

[10] Board of Trade Papers: Proprieties, XIII, S 15, S 50.

[11] *Ibid.,* XIII, S 44.

[12] Board of Trade Papers: Plantations General, XI, M 1. The purpose of this clause was for the "better Encouragement of Manufacturers of Iron into Wares within this Kingdom, and to preserve as much as may be the Dependence of the said Plantations upon Great Britain."

tic as the one inserted by the House of Lords in the Naval Stores Bill of 1719.[13] On the other hand, as in 1719, it was provided that sow iron and pig iron should be admitted duty free from the plantations.[14]

The colonial agents used all their influence in opposing the clause in the bill of 1729 which would have suppressed all colonial forges. New Jersey's colonial agent argued that to prohibit the making of bar iron in the plantations would be harmful to the manufactures of Great Britain. He claimed that such iron would become so expensive that even ships could not be built in the American colonies. Not having means to purchase English goods, the American market would greatly contract, and would place British manufacturers at a disadvantage.[15]

The activities of the colonial agents to prevent the passage of such a bill may be seen in their letters. Jonathan Belcher, writing to Governor Talcott of Connecticut, stated that only by "proper and diligent application" the clause relating to the colonial iron industry was struck out.[16] Governor Talcott wrote to Jeremiah Dummer, the dismissed Connecticut agent, thanking him for the assistance he had given against the bill, and asking him to continue his good work.[17] The agents were aided in their struggle by many manufacturers of hardware and iron products, who were always anxious to secure American bar iron at low prices.

Attempts to control the colonial iron industry continued, although the excitement occasioned by such endeavors died down. In 1732, when the bill to restrict the manufacture of hats in the colonies was being considered, the London manufacturers of iron wares, together with the merchants, petitioned Parliament asking that a clause be added to the bill to prevent the exportation

[13] *Letter to a Member of Parliament Concerning the Naval Store-Bill,* pp. 12-13.

[14] Board of Trade Papers: Plantations General, XI, M 1.

[15] *New Jersey Archives,* First Series, XI, 177-183.

[16] Jonathan Belcher to Governor Talcott, May 20, 1729, *Talcott Papers,* Connecticut Historical Society, *Collections,* IV, 167-169.

[17] Governor Talcott to Jeremiah Dummer, February 22, 1730-1731, *Talcott Papers, Ibid.,* IV, 220. The able and accomplished Dummer was agent for Massachusetts from 1710 to 1721, and for Connecticut from 1712 until 1730.

REFINERY FORGE HAMMER

of wrought or manufactured iron articles to any place from the colonies.[18] Parliament did not heed the petition, for the "Bill to Prevent the Exportation of Hats out of his Majesty's Colonies and Plantations in America" passed without any clause relating to iron manufactures.[19]

About this time, however, the Board of Trade really began to realize that many manufactures, including those of iron, were being developed in the colonies, which would eventually greatly interfere with those of England. A *Representation* to the House of Commons on manufactures in the colonies complained: "By such Lights as we have been able to acquire, we find the Trades carried and the Manufactures set up there, detrimental to the Trade, Navigation, and Manufacture of *Great Britain.*"[20] The Board pointed out that reports from the colonial Governors in regard to manufactures were exceedingly incomplete. For example, it stated that the Governor of Rhode Island, in his report, took "no Notice of any Sort of Manufacture set up there."[21] The Board concluded: "From the foregoing State it is observable, that there are more Trades carry'd on, and Manufactures set up in the Provinces on the Continent of *America* to the Northward of *Virginia*, prejudicial to the Trade and Manufactures of *Great Britain*, particularly in *New England*, than in any other of the *British* Colonies, which is not to be wonder'd at; for their Soil, Climate, and Produce being pretty near the same with ours, they have no Staple Commodities of their own Growth to exchange for our Manufactures, which puts them under a greater Necessity, as well as under a greater Temptation of providing for themselves at home."[22] A similar *Representation* was sent to the House of Lords.[23] A committee was appointed to consider it.[24] Although a report was made by this committee, no further action was taken in the matter at this time, and the dis-

[18] *Journals of the House of Lords,* XXIV, 97.
[19] 5 George II, c. 22.
[20] *Historical Register,* XVIII, 42.
[21] *Ibid.,* XVIII, 47.
[22] *Ibid.,* XVIII, 47-48.
[23] *Journals of the House of Lords,* XXIV, 328-329.
[24] *Gentleman's Magazine,* IV (1734), 176.

turbing and aggravating problem of colonial manufactures was cast aside.[25]

The agitation for regulating the American iron industry broke out again in full fury in 1735 and continued for the next few years. The re-opening of the controversy was due chiefly to four things: (1) At the close of the year 1734, the King of Sweden issued an edict prohibiting the importation of certain types of English goods and placing a high duty, almost prohibitory, upon all other imports except woolen hose and yarn.[26] British iron manufacturers made use of this exigency by demanding that the duties on colonial bar iron be removed. (2) The first relatively large shipment of bar iron from the colonies was made in 1735, fifty-five tons being sent from Pennsylvania, Maryland, and Virginia.[27] Naturally, this disturbed the English forge masters. (3) The six navy yards of Deptford, Woolwich, Chatham, Sheerness, Portsmouth, and Plymouth made tests of a part of this bar iron. The results showed that with the exception of one small lot tried at Deptford, American bar iron was equal to the best Swedish iron.[28] (4) A depression in the British iron industry began about 1735 and continued several years. This fourth reason, no doubt, was the most important one. Many English forges were idle, and manufactured ironware was becoming a drug on the market. Orders had fallen off and stocks were accumulating in the warehouses. The iron manufacturers, ironmongers, and merchants claimed that they were losing the great markets of America, because the colonists were turning their own bar iron into manufactures of various kinds.[29] They

[25] Historical Manuscripts Commission, *Fourteenth Report,* Part 10, p. 5.

[26] Report of Committee of House of Commons, Penn MSS., XIII, Document 27; *Journals of the House of Commons,* XXII, 854.

[27] House of Lords MSS., No. 185; Harry Scrivenor, *History of the Iron Trade,* Appendix, p. 331.

[28] *Journals of the House of Commons,* XXII, 850; Penn MSS., XIII, Document 1.

[29] *Ibid.,* XIII, Document 45. One writer bemoaned the fact that much capital had been used to develop iron manufactures in a "distant Clime." He believed that this money should have been spent in building up industry in England. *Gentleman's Magazine,* VIII (1738), 465.

demanded, therefore, the suppression of all colonial iron manufactures and also legislation which would encourage the colonists to send their bar iron to England.

When in the summer of 1735, Walter Carey, an ironmonger and a manufacturer of iron wares, and John Banister, an official of the famous Crowley Works, were called before the Board of Trade, the controversy began. Carey stated that iron from the plantations was as good as Swedish iron. He believed it preferable that bar iron rather than "Sows and Piggs" be sent duty free from the colonies because sow iron and pig iron could not be manufactured into bars without charcoal. With wood selling at such high prices in England, he said that it cost more to produce iron at the English forges than to import it from Sweden. He also pointed out that the colonists were able to make iron wares of all kinds for their own use, and even exported quantities of pots and pans to the Sugar Islands.[30]

Banister gave a somewhat technical description of various types of iron imported into England. Most of the 2,000 or 3,000 tons of bar iron imported from Russia came from Siberia, although a small quantity was made at Nawa.[31] Russian iron, he stated, was very ordinary, and chiefly used for making nails. Russian Government iron, marked with a spread eagle, was tough and made good rods and hoops. But in general Russian iron was "cold-short," and not fit to be used in shipbuilding. He believed that iron from the plantations was as good as Swedish or fifty per cent better than Russian, and suggested that if the importation of American bar iron was not encouraged the planters would use it for manufacturing. Spanish iron, he said, was "red-short," and never used in making anchors. Only a small amount entered the kingdom. He estimated that there were about twenty slitting mills in England, and suggested that the slitting of Russian iron

[30] Journals of the Board of Trade, XLV, 104-105.

[31] Peter the Great devoted much attention to developing the Russian iron trade. Under his authority, Count Demidoff built the Neviamski works in the Ural Mountains in 1701. The industry developed rapidly from this time on, and Russian iron soon began to compete with Swedish. William Tooke, *View of the Russian Empire,* I, 93 ff., II, 551 ff.; Harry Scrivenor, *History of the Iron Trade,* pp. 160 ff.

be prohibited and that the American colonists be prevented from erecting any more slitting mills.[32]

The renewed interest of the Board of Trade in the question of colonial iron brought about a shower of petitions and pamphlets that continued for two or three years. The manufacturers of iron wares petitioned Parliament against the colonists being permitted to make axe-heads, shovels, nails, and other products from bar iron. They stated that the depression in the British iron trade was due largely to the loss of American markets, and asked that the colonists be prohibited entirely from making secondary iron products of all kinds.[33]

In order to protect their interests, the merchants, together with the mercantile and shipping interests, sent counter-petitions to Parliament, stating that while premiums were paid on the importation of tar, pitch, turpentine, hemp, masts, yards, and bowsprits, no encouragement of any sort was given to the importation of iron from the American colonies.[34] They maintained that American iron was equal to the best Swedish iron, of which 20,000 tons were imported annually, together with lesser amounts from Spain, Russia, and other places. Since many furnaces and forges were being built in the colonies, England could be rendered entirely independent of any foreign country within a few years in regard to a "commodity so essential to navigation." If encouragement were not given to the importation of pig iron and bar iron, it was inevitable that the colonists would manufacture their bars into wrought iron products to the great

[32] Journals of the Board of Trade, XL, 173-174.

[33] *Journals of the House of Commons,* XXII, 773, 776, 777, 780, 788, 791, 828. English manufacturers were becoming more and more important, and were looking to the colonies to furnish a market for the manufactures and finished products of the mother country. A little more than a decade later than the period now under discussion, the writer of a pamphlet criticizing the peace of 1748 and especially the failure to acquire Canada, exclaimed: "Good God! what an immense Profit would it have been to us to have supply'd all North America with British Manufactures, and in return to have received their rich Furs?" Quoted in G. L. Beer, *British Colonial Policy, 1754-1765,* p. 136.

[34] 3 and 4 Anne, c. 10.

detriment of the industry in England. Therefore, they asked that encouragement be given to the importation of sow, pig, and bar iron, and that the manufacture of iron wares in the colonies be restrained.[35]

The petitions of the manufacturers of iron wares, of ironmongers, of merchants, and also of the shipping interests were in agreement as to one thing: that secondary iron products should not be made in America. This naturally benefited the shippers, for they wished to continue carrying such manufactures from England to the colonies. The elaborate report given by a Parliamentary committee in April 1737, together with hundreds of pamphlets printed and circulated by the various groups, show the many conflicting interests:

(1) The furnace owners complained of the low duties on pig iron from the colonies and asked that they be raised in order that their product might be protected.

(2) The forge owners were interested in getting pig iron duty free from America, so that there would be a continual supply, and in order that there might be competition between American and English pig iron, which would result in lower prices. It was to their interests also, that the high duties on bar iron—their own product—should remain.

(3) The manufacturers of secondary iron wares and products wished to secure bar iron from America free of all duties, and also wanted all manufactures of iron wares in the colonies suppressed because such competition was seriously interfering with their manufactures.

(4) The shipping and mercantile interests of Great Britain were anxious to have the duties on pig iron and bar iron removed, and also the manufacture of secondary iron products in the colonies prohibited. Thus they could send their vessels to America with British manufactured iron wares, as well as other goods, and in return bring back colonial pig iron and bar iron.

(5) British woolen merchants wanted the duties taken off American pig and bar iron because they believed that such ac-

[35] *Journals of the House of Commons*, XXII, 772, 810.

tion would stimulate the woolen trade, their woolen goods being taken in exchange for iron.[36]

The report of the Parliamentary committee contained a *Representation* from the Board of Trade relating to the condition of manufactures in America.[37] The Board stated: "The People of *America* having discovered several Iron-mines, and set up Forges, it is to be feared, that they will work up their Iron in Manufactures, which may be prejudicial to those of this Kingdom, if some effectual Means be not found to induce them to import it, in Pigs and Sows into *Great Britain*." The committee had examined many witnesses and their testimony was included in the report. It was brought out that Sweden took only from £20,000 to £30,000 worth of manufactured goods in return for more than £150,000 worth of bar iron sent to England, the balance of course being paid in specie.[38] It was shown that the chief market for English manufactured goods was America. Sweden would never become a market for them. Further, an effort was being made by Sweden to exclude even the small amount of English goods sent there. A copy of the edict of the King of Sweden dated December 11, 1734, and also a copy of the law imposing high duties on goods and merchandise imported into Sweden after January 1, 1735, were presented. The effects of these duties, which would keep many classes of English manufactures from entering Sweden, were emphasized.[39]

An ingenious argument was presented to the committee by the opponents of free American iron. They maintained that the Dutch competed closely with the English in secondary iron manufactures and that the smallness of their duties on imported iron, low wages, and cheap selling prices gave them a decided advantage. If colonial iron should be admitted into England duty free, they said, then Swedish iron would have to look for another market. In so doing, the Swedes would have to reduce their prices. Thus the Dutch would get even cheaper iron and they would be-

[36] *Ibid.*, XXII, 850 ff.; Penn MSS., XIII, Documents 1-45.
[37] *Journals of the House of Commons*, XXII, 851.
[38] *Ibid.*, XXII, 853.
[39] *Ibid.*, XXII, 854.

come even more formidable competitors with Great Britain in regard to manufactured iron wares.[40]

Those who opposed admitting American iron duty free also stated that American iron was like English iron, and not nearly as good as Swedish. (The tests at the navy yards, however, had proved otherwise.) They said, further, that it was necessary to import some foreign iron, but that too much was being brought in. The 18,000 tons of bar iron made in England in 1718 had declined to 12,000 tons annually or at most to 15,000 tons. If encouragement were given to the importation of bar iron by admitting it duty free from the colonies, it would affect English iron before foreign importations, and thus shut down additional English forges.[41]

Following the report of the committee, many petitions found their way to Parliament from proprietors of ironworks, ironmasters, owners of forest and woodlands, tanners, miners, woodcutters, charcoal colliers and other workmen.[42] These opposed the admittance of any iron into Great Britain duty free. It was stated that many furnaces and forges had been shut down and that many which remained in operation were turning out little iron. Men were out of work everywhere and conditions were getting worse. The coppices which were kept chiefly for providing the ironworks with fuel, but also for supplying the navy with oak, as well as tanners with the bark of trees, would be "grubbed up" and used for other purposes.[43] Thus many connected indirectly with the iron industry would suffer with those directly concerned if the colonial iron industry was encouraged. They asked that the duties be increased on all iron imported into Great Britain and that encouragement of some sort be given to the English proprietors of ironworks and to the owners of woods.

Parliament took no action, and in the spring of 1738 the condition of the English iron trade grew still worse. This became pronounced, especially in secondary iron manufactures. Petitions

[40] *Ibid.*, XXII, 852.
[41] *Ibid.*, XXII, 853.
[42] *Ibid.*, XXII, 862, 873.
[43] *Ibid.*, XXII, 862-863.

were sent to Parliament from merchants, iron manufacturers, ironmongers and others of Birmingham, Wolverhampton, Stourbridge, Dudley, and adjacent parts in the counties of Warwick, Stafford, and Worcester.[44] These stated that warehouses were stocked with iron manufactures, the reason for this condition being found in the growing American industry. They asked that the manufacture of iron wares in the colonies be suppressed and that they be granted some relief.

Another Parliamentary committee was appointed and in May, 1738, the following resolutions were debated in the House of Commons:

Resolved, That it is the Opinion of this Committee, That the making of Bar Iron in *Great Britain* is greatly decreased.

Resolved, That it is the Opinion of this Committee, That the Manufactures from Bar Iron in *Great Britain* are greatly decreased.

Resolved, That it is the Opinion of this Committee, That the Making and Manufacturing of Bar Iron in the Plantations is one great cause of the said decrease.

Resolved, That it is the Opinion of this Committee, That no Slitting Mills or Steel Furnaces be erected or worked in the Plantations.

Resolved, That it is the Opinion of this Committee, That the Forges, Bloomeries, and other Works, for the Making of Bar Iron in the Plantations be restrained.

Resolved, That it is the Opinion of this Committee, That no Addition of Hearths or Wheels be made to those Forges, Bloomeries, or other Works, for the making of Bar Iron, already in Use, in the Plantations.[45]

Soon after the debate on these resolutions, a "Bill for Encouraging the Making of Bar Iron in Great Britain and Preventing the Increase of Bar Iron and Iron Manufacture in the Plantations" was drawn up. A copy was promptly sent to the proprietors of Pennsylvania by Ferdinand John Paris, the colonial agent of that province.[46] It provided that no slitting mill or

[44] *Ibid.*, XXIII, 15, 33.

[45] *Ibid.*, XXIII, 157.

[46] Penn MSS., XIII, Document 43. Paris, a London solicitor, was extremely active in representing various colonial and individual interests from 1730 to 1760. Thomas Hutchinson wrote of him as being "one of the first rate and

steel furnace should be allowed in any colony. No more forges or bloomeries for making bar iron should be erected, although those already in operation were permitted to continue. No additional hearths or wheels should be added to those forges already established. Heavy fines were provided for violation of the law, and illegal ironworks were to be demolished within three months after information had been received by the authorities.[47] The bill failed on the first reading.[48] Richard Partridge, the colonial agent of Rhode Island, wrote to Governor Wanton of that colony: "Alltho' the House of Commons have come to divers resolutions with respect to their Cramping the Plantations in making or manufacturing Iron, yet when a Bill was brought into the House for that purpose and read, there was a Negative soon put upon it."[49]

Fresh crops of petitions and pamphlets continued and other attempts were made at legislation. Several bills were drafted in rapid succession.[50] Bearing date of April 1739, a "Bill for Promoting the Exportation of the Woollen and Other Manufactures of this Kingdom, and for Encouraging the Importation of Iron from America and for Restraining the Increase of Iron Manufactures there and for Laying a Further Duty on Swedish Iron" was drawn up by a committee. The clauses pertaining to iron provided that all sow, pig, and bar iron from the colonies be freed of all customs, poundage, rates, duties, impositions and charges of all kinds. No additional slitting mills or steel furnaces should

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who had a peculiar talent at slurring the characters of his antagonists. Many of his briefs which I have seen abound in this way." *History of Massachusetts* (1768 Edition), II, 384.

[47] Penn MSS., XIII, Document 43.

[48] *Journals of the House of Commons,* XXIII, 172.

[49] *Correspondence of the Colonial Governors of Rhode Island,* I, 87, 90.

[50] Penn MSS., XIII, Documents 35-39, 67; *Correspondence of the Colonial Governors of Rhode Island,* I, 90-94. On the margin of a copy of one of the bills sent to Thomas Penn by Paris, is the comment in regard to the clause prohibiting the exportation of American nails, tools, and iron manufactures: "This is an ugly clause in its consequences." He continued that if it became law, it might prevent sending a colonial vessel to Great Britain because it contained American bolts. Penn MSS., XIII, Document 39.

be erected in the colonies. A duty of £10 per ton on the exportation of all foreign steel from Great Britain and Ireland to the colonies was imposed. It was expected that this provision would put an end to the manufacture of steel tools in America. After September 1, 1739, no wrought iron manufactures, including nails, tools, etc., could be exported from one colony to another or to Europe.[51] As was the case with the other similar bills drafted about the same time, this bill did not get very far.

The agitation for the regulation and control of the colonial iron industry now seemingly came to an end, at least for a short time. For various reasons conditions in the iron trade began to improve somewhat. Then trouble with Spain loomed on the horizon, and the attention of the country was turned to the War of Jenkins' Ear, which merged into the War of the Austrian Succession. The reason why Parliament passed no legislation in regard to the colonial iron industry can be clearly seen. The struggle that had been going on for years had been waged by several groups having different interests. With so many divisions, it was impossible to secure legislation favorable to any group, and Parliament postponed action. One writer of the period stated that "so many jarring interests prevented the legislature from doing anything at this time therein."[52] However, the way was prepared for future action, and when the question was revived in 1750, an act was speedily passed to regulate the production of iron in the American colonies.[53]

Although the struggle had come to an end for the time being, efforts to obtain advantages for colonial iron still continued. Thomas Penn wrote from England to a friend in Pennsylvania in 1743:

> I have had much at heart the getting the Duty taken off Iron and have mentioned it to Gentlemen concern'd, in order to apply to Parliament the two last Sessions, but it was an improper time. We were then, and are still courting the Iron Powers, nay the Rus-

[51] *Ibid.*, XIII, Document 67.

[52] Adam Anderson, *Origin of Commerce,* III, 218; David MacPherson, *Annals of Commerce,* III, 215.

[53] 23 George II, c. 29.

sians will be now more company to us than ever, in case we enter into a Warr with France which I think seems very probable, so that this year nothing will be done.[54]

The European wars during the decade of the forties did much to keep in the background the struggle between the groups. But when the wars ended in 1748, the exigencies of the European situation which appeared even before the ink on the Treaty of Aix-la-Chapelle was dry, were to be made use of in bringing the question of the regulation of the colonial iron industry once again to the attention of Parliament.

[54] Thomas Penn to Richard Hockley, August 19, 1743, Pennsylvania Miscellaneous Papers: Penn and Baltimore, Penn Family, 1740-1756, Document 41.

IV

LEGISLATION

Colonies under proper regulations are of great service to a Nation.—*Reflections on the Importation of Bar Iron,* p. 9.

THE agitation caused by the various groups who were engaged in a struggle for their own interests continued for more than a generation. During that entire period the controversy did not die away once. At times it simply smouldered, to burst out into flames periodically when some exigency such as war, or some situation seemed to favor a renewal of the struggle. Such a condition occurred immediately after the Treaty of Aix-la-Chapelle was signed in 1748.

As soon as the treaty had been concluded, war clouds loomed on the horizon of Europe again. Russian and Swedish troops were threatening each other on the borders of Finland. At the same time, with France pledged to Sweden, and England bound under the terms of a treaty to aid Russia in certain contingencies, many factors seemed to favor a renewal of war. The agreement between England's political enemy, France, and her industrial competitor, Sweden; the fear of another great struggle which would again involve England; opposition to a new treaty between Sweden and Denmark;[1] increasing unfriendliness between the courts of London and Stockholm; and indignation and contempt at the treatment of the British representative at Stockholm who was recalled about this time,[2] were factors which the groups struggling for British regulation of the colonial iron industry could not ignore, and which they made use of to set the

[1] W. Cobbett, *Parliamentary History of England,* XIV, 494 ff., 822 ff.; *Gentleman's Magazine,* XX (1750), 178; T. S. Ashton, *Iron and Steel in the Industrial Revolution,* p. 118.

[2] *Gentleman's Magazine,* XVIII (1748), 238; C. H. Firth and J. F. Chance, *Diplomatic Relations of England with the North of Europe,* p. 3.

stage for another conflict. While Parliament was struggling with these foreign problems, the question of regulating the American iron industry was once again introduced.

In February 1749-1750, Parliament took up the problem of the unsatisfactory condition of trade and commerce with Sweden.[3] Another duty had been added to the almost prohibitory duties on English manufactured goods, and there were rumors of an agreement among the Swedish ironmasters to increase the price of their iron. It was shown anew that only a small amount of British merchandise found its way to Sweden, while Great Britain continued to import most of her bar iron from that country. The House of Commons, while considering the problems of commerce with Sweden, passed the following resolution:

> That it is the Opinion of this Committee, That the Duties on Pig and Bar Iron made in, and imported from, his Majesties Colonies in *America* be taken off.[4]

A Parliamentary committee, headed by Charles Townshend, was appointed and ordered to bring in a bill permitting pig and bar iron from the American colonies to be admitted free of all duties. A few days later, through the pressure of the British manufacturers of iron wares, the committee was instructed to add a clause to their bill, forbidding the making of steel in the colonies and prohibiting the further erection of slitting mills there.[5]

While the bill was pending in the House of Commons, many petitions were sent to Parliament for and against it. The ironmasters, mine owners, forest growers, tanners and others of Sheffield,[6] Chesterfield, Wakefield, Leeds,[7] Southwark,[8] Doncaster,[9] and Bristol,[10] and the counties of Hereford, Gloucester,[11]

[3] *Journals of the House of Commons*, XXV, 979; Penn MSS., XIII, Document 75.

[4] *Journals of the House of Commons*, XXV, 979.

[5] *Ibid.*, XXV, 986.

[6] *Ibid.*, XXV, 1018-1019.

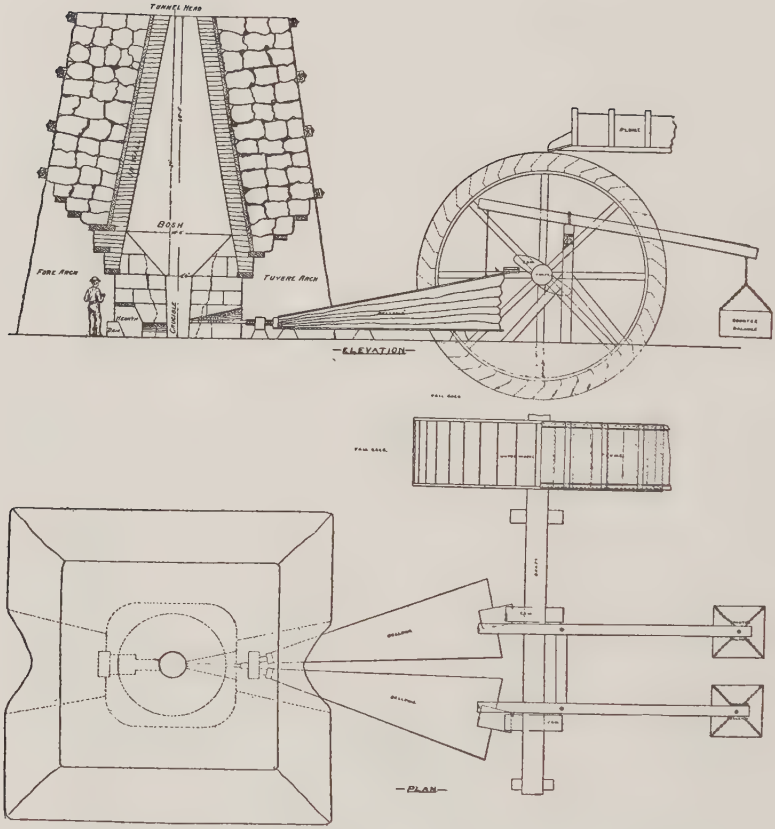
[7] *Ibid.*, XXV, 1042.

[8] *Ibid.*, XXV, 1051.

[9] *Ibid.*, XXV, 1048.

[10] *Ibid.*, XXV, 1061.

[11] *Ibid.*, XXV, 1021.



PLAN OF EIGHTEENTH CENTURY COLD-BLAST CHARCOAL FURNACE

Monmouth,[12] Stafford,[13] Brecon,[14] Westmorland,[15] and Lancaster,[16] protested against the bill. All the arguments used in the earlier struggles were brought out once more. It was stated that if the bill passed and duties were taken off American iron, the importation of Swedish iron into Great Britain would not be lessened, but the result would be great competition between American iron and English iron, both of which were of the same nature. Not only would English furnaces and forges be destroyed, but the owners of woodlands would also be greatly injured, as it would not be profitable henceforth to grow forests. With the reduction of forests, the supply of oak bark would be lessened and the tanning trade, therefore, ruined. The petitioners asked that duties be kept on pig iron and bar iron. A dreary picture was painted of the consequences if the bill became law. The ironmasters, they said, would be ruined, thousands of workers would be thrown out of work who would have to be supported by the parishes or else starve; the owners of woodlands would have no source of income and would be unable to pay their tithes, taxes, and rates; the tanning trade, for many years so beneficial to England, would come to an end; and misery and poverty would be spread all over the country.

The manufacturers of iron wares of Birmingham,[17] of the region of Hallamshire including Sheffield,[18] and of many towns in Lancashire,[19] together with the merchants and shippers of Liverpool and other places in Great Britain[20] also used the arguments that had been used years before when they demanded that the importation of colonial iron be encouraged. They said that it would be to the advantage of Great Britain to be free from dependence upon the Northern Kingdoms, especially Sweden,

[12] *Ibid.*, XXV, 1022.
[13] *Ibid.*, XXV, 1046.
[14] *Ibid.*, XXV, 1048.
[15] *Ibid.*, XXV, 1053.
[16] *Ibid.*, XXV, 1063.
[17] *Ibid.*, XXV, 1038.
[18] *Ibid.*, XXV, 1096.
[19] *Ibid.*, XXV, 1098.
[20] *Ibid.*, XXV, 1046. The same arguments were set down in a variety of pamphlets.

for the supply of a great quantity of iron, most of which was paid for in cash; that American bar iron was as good as Swedish; that in case of war England ought to be independent of foreign countries for a supply of iron; and that woolen and manufactured goods of all kinds could be sent to the colonies in exchange for iron, thus saving the export of so much specie and ready cash to Sweden. The Merchant Adventurers of Bristol petitioned the House of Commons for the importation of bar and pig iron from the colonies into Great Britain duty free and for a restriction on slitting mills and plating mills.[21] These groups favored the suppression of all secondary iron manufactures in America in order to prevent competition. While the finely worded petitions were in accord with true mercantile principles, they really reveal the self-interest of the various parties.

The bill drawn up by the committee passed the House of Commons amid much controversy and opposition.[22] It was distinctly a compromise and the best that the divergent groups could hope to obtain. While the bill was before the House of Lords, many petitions were sent there by the different groups, containing the same arguments which had been presented to the House of Commons.[23] The bill passed the House of Lords without any great difficulty, received the royal assent, and became law in April 1750.[24]

The act of 1750 was "highly applauded" in England although it was pointed out that the fruits of victory went to the London iron manufacturers,[25] who could now receive bar iron from the

[21] *Journals of the House of Commons,* XXV, 1046.

[22] *Ibid.,* XXV, 1101. Before the passage of the bill, many thought that the opposition of the ironmasters and other groups would exert a sufficient influence on Parliament to have the bill again defeated as in 1719 and 1736-1739. Richard Partridge to Jonathan Law, February 16, 1749-1750, *Law Papers,* Connecticut Historical Society, *Collections,* XV, 363-366.

[23] House of Lords MSS., No. 183; *Journals of the House of Lords,* XXVII, 447, 450, 455.

[24] *Journals of the House of Commons,* XXV, 1115.

[25] Jonathan Law to Richard Partridge, August 22, 1750, postscript to letter of June 25, 1750, *Law Papers,* Connecticut Historical Society, *Collections,* XV, 414.

colonies duty free and in return send their manufactured iron products. The Earl of Lonsdale declared that the bill met with a great deal of opposition from many groups of people, but that since colonial bar iron could be sent to London alone free of duty, the ironworks of Great Britain would not be immediately affected, the iron manufacturers of the metropolis using foreign iron almost entirely. He looked forward to the future with grave misgivings if the attempt to secure large quantities of American iron met with success.[26] Another writer, commenting on the provisions of the act, stated that it was introduced at the proper time when Sweden was laying further duties on British goods. He pointed out that the production of English iron was decreasing in quantity and quality. The suggestion was made that no money should be paid to the colonists for iron, but that returns should be made in woolen and iron manufactures, thus saving the specie which was being sent to Sweden for supplies of bar iron. In conclusion, this writer stated very definitely that the act in no respect was intended to benefit the colonists, but that the more iron they would send to the mother country, the greater amount of manufactures could be returned.[27] Few comments were made regarding the entire removal of the small duty on American pig iron.

In the colonies the passage of the act was looked upon with mixed feelings. Jonathan Law expressed the opinion of many when he said that the act removed one difficulty (the duties on pig iron to all English ports and on bar iron to London) by

[26] Historical Manuscripts Commission, *Twelfth Report,* Part 7, p. 357.

[27] "Considerations on the Bill to Encourage the Importation of Iron from America," Penn MSS., Document 75. A correspondent to a well-known English magazine expressed these ideas very clearly in a somewhat different manner: "For whereas the *Swedish* markets receive none of our British manufactures in exchange of theirs, but drain us of our ready specie, and thereby consume the very vitals of the nation; our brethren of *America* on the contrary will, for their pig and bar iron, take the very same commodity back again manufactured into locks, nails, utensils, and other various implements necessary for their accommodation; so that the mother country has the benefit of employing her own hands for the colonies in the very same commodity they send her for the common use of both." *Gentleman's Magazine,* XX (1750), 178.

introducing a greater one instead (the restrictions on certain types of works). "It seems," he wrote, "that for the Same reason that one mill or Engine for the better improvement of the Countrys produce may be putt down, another may also. . . . A like attempt was made in the Reign of King George the first . . . to engross the whole Manufactg. of Iron and putting the Plantations under the Circumstance of the Children of Israel when they had no Smiths but it was happily put by as too Great a Burden for a Free people to Sustain."[28] Thomas Penn regarded the restrictions as an attack on the rights of the colonists, while William Bollan, the colonial agent of Massachusetts, also bitterly attacked them from the same point of view.[29] The traveler, Andrew Burnaby, found a great deal of dissatisfaction throughout Pennsylvania and New York because of the restrictive clauses of the law.[30]

Owing to the lack of clarity used in the bill as drawn up by the committee, the act of 1750 has been greatly misinterpreted. This was pointed out by a writer before the bill passed, who stated that small alterations would be necessary to make it clear.[31] No change, however, was made in the draft, and the wording of the act was left vague for future historians to misinterpret. The colonists were in doubt for some time as to whether the act put an end to all slitting mills, plating mills, and steel furnaces, or whether it was directed against the erection of new works of these types. Jonathan Law presented the problem clearly when he wrote:

> Concerng ye Iron act two Constructions are putt upon it, one is that its levell'd against all Engines their Enumerated, the other is that its only against Such as Should be erected after the 24th of June one Exposeth me to the Informer the other to the Proprietor, Some Say the word (or) is Disjunctive, and then they

[28] Jonathan Law to Richard Partridge, June 25, 1750, *Law Papers,* Connecticut Historical Society, *Collections,* XV, 410.

[29] Thomas Penn to James Hamilton, May 1, 1750, Bancroft Collection: Penn's Letters, 1748-1771; William Bollan to Secretary Willard, April 5, 1750, Bancroft Collection: Massachusetts Papers, 1748-1755.

[30] A. Burnaby, *Travels through the Middle Settlements in North America,* p. 115.

[31] "Considerations on the Bill to Encourage the Importation of Iron from America," Penn MSS., XIII, Document 75.

read it Shall Either Erect or Continue Such Engine and the word (Such) has reference to the Engine and not to the time of its Erection, and it had been Easy to have Excepted those which were Erected before 24th of June and in the Margin, its Said, no Mill, etc. to be erected or Continued in America. Others Say the Word (or) is Copulative and taken for (and) and the Relative (Such) referrs to the time of Erection and not to the kind of Engine and then they read it thus that no Mill and so forth shall be Erected after the 24th of June 1750 and Continued and the obligation of the Govr. etc. to Give a Particular acct. of Every Mill, etc. at the time of the Commencement of this Act erected in his Colony Expressing also Such of them as are Used and the names of the Proprietors of Each Such Mill etc. and the Place where Such Mill etc. is erected and the Number of Engines, Forges and Furnaces in Sd. Colony Could be to no purpose if they were to be demolished as well as those which Should be erected after 24 of June as the Sign upon the Door posts of the Children of Israel. Whereupon I crave your Advice for "Incidet in Scyllam Qui Vult Vitare Charybdim". The Addition or Omission of a word or two Would have made it intelligible to me in Either Constructions design'd.[32]

Acrelius, the Swedish pastor who lived at Christiana on the Delaware at the time the act was passed, mistakenly and erroneously wrote a few years later that no one was allowed to make nails in the colonies and that all trip hammers were silent because they were condemned under the provisions of the act.[33] Burnaby was also under misapprehension regarding the restrictive clauses of the act, for he likewise believed that all slitting mills had been suppressed.[34] This was not the case, for those in operation before the law went into effect were allowed to continue.

The act of 1750 provided that after June 24, 1750, all subsidies, customs, impositions, rates, and duties on pig iron from the American colonies into Great Britain should cease.[35] Bar iron could be imported into London free of all duties. The duties remained on bar iron imported into all other ports of Great Britain. Bar iron shipped to London could not be carried by land

[32] Jonathan Law to Richard Partridge, August 22, 1750, postscript to letter of June 25, 1750, *Law Papers,* Connecticut Historical Society, *Collections,* XV, 413-414.

[33] Israel Acrelius, *History of New Sweden,* p. 167.

[34] A. Burnaby, *Travels through the Middle Settlements in North America,* p. 115.

[35] 23 George II, c. 29.

or water farther than ten miles from the city except to the royal navy yards. Heavy penalties for violations were provided.[36] To prevent fraud, all colonial iron sent to England had to be stamped with some mark denoting the colony or place where it was made. All pig iron not stamped was liable to the same duties to which foreign iron was subject. All bar iron, likewise, sent to the port of London unstamped was subject to the duties on such iron from foreign countries.[37]

The second part of the act dealt with mills which turned out products beyond the bar-iron stage. After June 24, 1750, "no mill or other engine for slitting or rolling of iron, or any plating forge to work with a tilt hammer, or any furnace for making steel," should be erected in the colonies. Those in existence before this date were allowed to continue.[38] Thus three types of iron-works were restricted: (1) slitting mills which produced slit iron for making nails; (2) plating forges, or plating mills, where iron was hammered into sheet iron or tin-plate iron; and (3) steel furnaces where small amounts of blister steel were made, such steel being used chiefly for making tools. For every violation of this part of the act a penalty of £200 was to be imposed and the works destroyed.

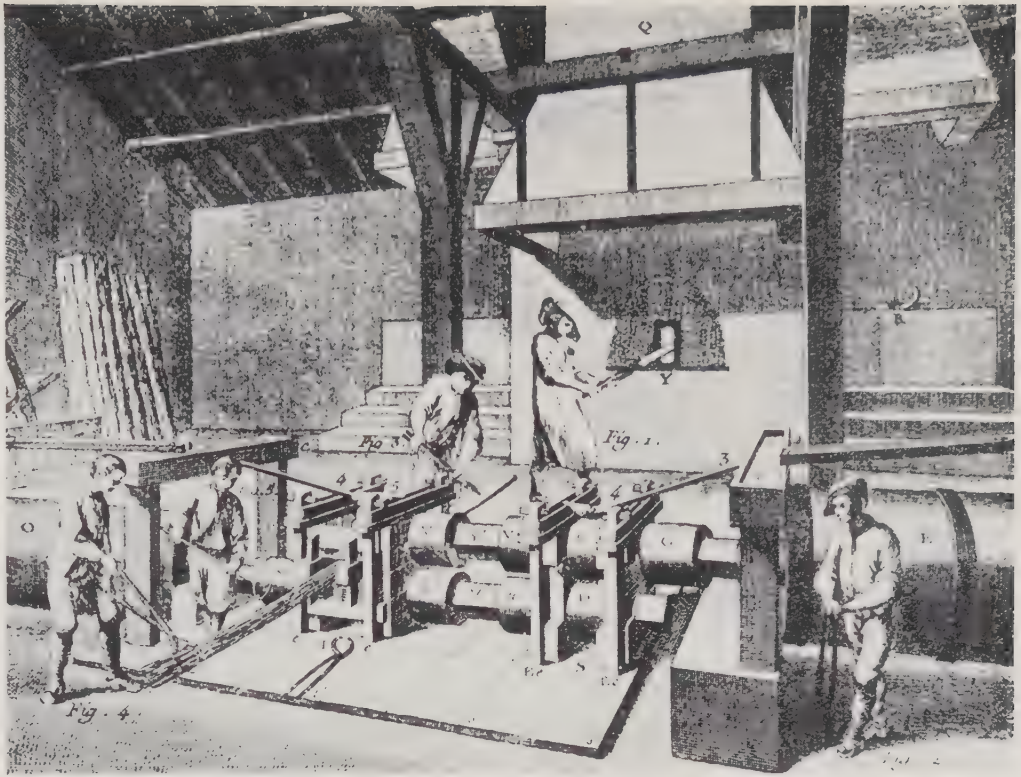
The Governor, Lieutenant Governor, or Commander-in-chief of a colony, on information made to him upon the oath of two or more credible witnesses was to condemn as a "common nuisance" any slitting mill, plating mill, or steel furnace erected after June 24, 1750. If such an official did not "order and cause every such mill, engine, forge, or furnace to be abated" within thirty days after information was given to him, he was subject to a fine of £500 and disabled from holding any office of trust thereafter. Those guilty of violating any part of the act were subject to heavy fines, one-half to go to the Crown, the other half to such persons "as shall sue for same."[39]

[36] *Ibid.*, Sections 1, 2.

[37] *Ibid.*, Section 7. The Principio Company stamped the iron it produced at its Lancashire Furnace thus: "Principio * LF * 1769." Thomas Russell to Michael Harris, February 3, 1769, Principio Papers, Emmet Collection.

[38] 23 George II, c. 29, Section 9.

[39] *Ibid.*, Section 15.



ROLLING AND SLITTING MILL

The Board of Trade ordered its secretary to transmit a copy of the act to the Governor of each colony with instructions for putting it in force immediately. The Governors issued proclamations requiring the sheriffs of the counties or other officers to make returns of the number of slitting mills, plating mills, and steel furnaces in each county, together with the name of the owner and the date of the erection of each. Returns were made by the Governors to the Board of Trade on the basis of the information which they received from the sheriffs or other officers. Massachusetts reported having two slitting mills, Pennsylvania one, and New Jersey one. Of plating mills, Connecticut admitted having eight, Massachusetts two, New York one, New Jersey one, Pennsylvania one, and Maryland one. Pennsylvania accounted for two steel furnaces, while Connecticut and New Jersey reported that they possessed one each.[40] The number of ironworks of these types does not seem large, but it is quite evident, as will be shown in another chapter, that not all such works were included in the reports.[41] The development of secondary iron manufactures in the colonies was contemporaneous with the struggle in England for the regulation and control of the colonial industry, and all the works reported had been built since 1719.

Contemporaries pointed out that those who owned slitting mills, plating mills, and steel furnaces erected before the act went into effect would enjoy a monopoly since none could be legally built after the law was in force.[42] This was clearly seen at the time the bill was debated when the proposition was made to de-

[40] Journals of the Board of Trade, LIX, 4, 10, 19, 25, 60, 75, 96, 107, 207; Board of Trade Papers: Proprieties, XVIII, V 71, V 72, V 73, V 77, V 79, V 88; Colonial Office Papers, 5:886; *Pennsylvania Archives,* First Series, II, 52 ff.; *New Jersey Archives,* First Series, VII, 558 ff. The Governors of the colonies other than Massachusetts, Pennsylvania, New Jersey, Connecticut, New York, and Maryland asserted that there were no works of the restricted types within their colonies.

[41] In many places, the sheriffs or other colonial officers, who had sought and given information about these works, were severely criticized and condemned, while Surveyor-General Dunbar of Massachusetts was assaulted.

[42] Thomas Penn to Richard Hockley, July 1, 1750, Pennsylvania Miscellaneous Papers: Penn and Baltimore, Penn Family, 1740-1756, Document 131; R. Charles to Thomas Lawrence, February 10, 1750, *Pennsylvania Magazine of History,* VII (1883), 232, 233.

molish all such works and to pay the owners the equivalent of their value. It was urged, however, that since no prohibitory law was in force when they were built, and as their destruction would deprive people of a livelihood, that those already erected should remain.[43] When the bill was passed, therefore, the unfairness of destroying such works already in existence was recognized.[44]

Only a few years passed away before the shippers and merchants of many English cities began to demand the admittance of colonial bar iron free of duty into all ports of Great Britain. The outbreak of the Seven Years' War presented these groups their opportunity, since the two great iron-producing countries, Sweden and Russia, were lined up with France and the other enemies of Britain. In 1756 the society of Merchant Adventurers in the city of Bristol, which was largely engaged in the colonial trade, petitioned Parliament, stating that by the act of 1750, American bar iron was admitted without duty into the port of London, but could not be carried coastwise or more than ten miles inland, whereby several manufacturing towns were deprived of its use and of the advantage of exporting it to other countries because of the high duties. They asked that the duties be taken off American bar iron imported into any part of Great Britain.[45] The iron manufacturers of Bristol, Birmingham, Liverpool, and other cities also objected. The clauses of the law of 1750, which permitted colonial pig iron to enter Great Britain duty free and colonial bar iron only at the port of London, were severely and bitterly criticized. "This law," they complained, "is of no Service to the Manufacturer who lives about

[43] *Ibid.*, VII, 232.

[44] The proposal to prohibit the operation of slitting mills already established was defeated by a vote of 48 to 26. *Journals of the House of Commons*, XXV, 1091. During the debates, the jealousy of many manufacturing towns against London was exhibited when an attempt was made to include a clause in the bill which would have prohibited the slitting of any American iron brought to London. It was shown, however, that the cost of transporting slit iron from London to the towns of the Black country would prevent the metropolis from competing with them in this branch of the industry, and the clause was therefore dropped. Hardwicke Papers, DLXII, 128.

[45] *Journals of the House of Commons*, XXVII, 686.

Ten Miles from *London*, for the Pig Iron must unavoidably go into the Hands of the Iron Masters to be made into Bars, which gives them an Opportunity of setting their own Price upon *American* as well as *English* Bar Iron, and the *Swedish* Iron, called Orgroon (Oregrund), is monopolized."[46] Many petitions were sent to Parliament and meetings were held in Birmingham and elsewhere. This agitation produced counter-petitions, pamphlets, and discussions. Once again there was an intense contest and there appeared a deep national interest in the subject.

Those who opposed such a measure were the owners of forges and of woodlands, together with tanners and manufacturers of leather.[47] It was stated that the 109 forges in operation in England and Wales consumed annually 198,000 cords of wood grown on barren land which was almost valueless except for the use of ironworks and tanners; that American iron could never take the place of Swedish for tools, anchors, chain plates and other materials for shipbuilding, or compete with Russian iron in cheapness. Therefore, if American bar iron was admitted duty free to all ports, it would interfere with the production of British iron.

The reply to this was that the manufacture of goods was more valuable than the production of raw materials, and since the latter could not be obtained at home in sufficient quantities, it was the duty of Parliament to encourage the free importation of such materials from the colonies. Competition among neighboring nations in the production of raw materials made it necessary, more than ever, to obtain them at lower prices, or else lose the manufacture of iron and steel wares and products. Parliament should reduce the duties on foreign bar iron, or else force the

[46] "Reasons for Allowing the Importation of Bar Iron from America," Penn MSS., XIII, Document 77; *Journals of the House of Commons*, XXVII, 707, 714, 715, 743, 756, 757, 779, 782, 811, 840.

[47] *Ibid.*, XXVII, 777, 779, 787, 848-849. Suggestions were made during this period whereby it was hoped that Parliament would encourage the growing of timber in order to aid the English iron industry. *Gentleman's Magazine*, XX (1750), 249, 340, 444. Much concern was also felt for the diminishing supplies of naval timber, especially during the Seven Years' War from 1756 to 1763 when many new vessels were added to the British navy. R. G. Albion, *Forests and Sea Power*, pp. 133-134.

English ironmasters to bring down their prices by creating a rival in America. Further, they stated that iron could not be made as cheaply in the plantations as in England, on account of the high wages paid there, the high interest on capital, together with the cost of freight and insurance, especially in time of war. In their opinion, therefore, all duties on American bar iron should be abolished. In answer to the argument in regard to the woodlands, they said that the coppices grew on barren land unfit for tillage, but always worth something for wood and timber, and therefore the tanners did not need to fear a shortage of bark.[48]

When it became evident that the bill would pass, some noblemen and owners of woodlands sent in a petition[49] asking that they be relieved from the pressure of an act passed in the reign of Henry VIII which obliged the owners of coppice woods to preserve them.[50] They believed that the law would cause the destruction of English forges and consequently there would be a lessened demand for their timber. The committee which had charge of drawing up the bill was instructed to insert a clause repealing that part of the act of Henry VIII which prohibited the conversion of coppices into pasture or tillage.[51] A bill which permitted the importation of colonial bar iron into all ports of Great Britain free of duties, was at last reported,[52] passed both Houses and received the royal assent in 1757.[53]

In spite of the preferential treatment accorded colonial iron in the British market, only relatively small amounts of bar iron entered England from the colonies.[54] While small quantities were sent to other European countries, most of the bar iron made in the colonies at this time was converted into implements and wares for the use of the Americans. With a view, however, of

[48] *Journals of the House of Commons*, XXVII, 779, 782, 811, 840.
[49] *Ibid.*, XXVII, 848-849.
[50] 35 Henry VIII, c. 17.
[51] *Journals of the House of Commons*, XXVII, 849.
[52] *Ibid.*, XXVII, 848-849.
[53] 30 George II, c. 16.
[54] See Appendix D.

securing all shipments of colonial iron to England, Parliament added it to the list of "enumerated goods."[55] This action aroused a great deal of opposition in the colonies.[56] John Dickinson said that this restriction was "thought particularly severe" because mixed cargoes of iron, lumber, and provisions had yielded satisfactory results in the Portuguese and other markets.[57]

Opposition came also from the merchants of Cork. They complained that the enumeration of lumber would be "highly prejudicial" to Ireland, as the casks in which they packed and shipped their provisions to British forts, garrisons, plantations, and elsewhere, were made almost entirely from staves imported directly from America. Irish shipbuilding would also suffer, they stated, if American oak had to be sent to England first and then reëxported to Ireland. They also pointed out that the law would injure the Irish linen industry which to a great extent relied on colonial flax. Since flaxseed had to be kept perfectly dry, it could be shipped with security only on top of iron and lumber.[58] Parliament immediately reconsidered the problem, and passed a law

[55] 4 George III, c. 15.

[56] Some ironmasters, like William Allen, went so far as to state that the depression in the American iron industry during 1768 and the years that followed was due almost entirely to the enumeration of iron. This was not true, since only small amounts of iron had been sent to continental Europe prior to the passage of the act. The depression was due chiefly to the effects of too rapid expansion in the colonial iron industry. Allen and other ironmasters complained about the enumeration of iron because they hoped that their complaints would result in the passage of legislation by Parliament, granting large bounties on American pig iron and bar iron sent to England. See letters of William Allen to Thomas Penn, Penn Official Correspondence, X, Documents 116, 170, 174; Richard Penn to William Allen, April 16, 1768, Penn Letter Book, IX, Document 241.

[57] *The Late Regulations Respecting the British Colonies Considered,* in John Dickinson, *Writings,* I, 226.

[58] Colonial Office Papers, 5:338; Board of Trade Papers: Plantations General, XII, N 45. The act of 1764 made both iron and lumber "enumerated" commodities, although their direct exportation to any place in America, Africa, or Asia was permitted. Stephen Hopkins called attention to the evils of the enumeration of lumber on the Irish linen industry, as cargoes were often composed of lumber and flaxseed. *Rights of the Colonies Examined,* p. 14.

permitting the American colonists to export their iron and lumber directly to Ireland.[59]

Toward the close of the Seven Years' War, attempts were made to expand the policy of granting bounties on certain raw materials from the colonies. Writers like John Rutherfurd urged that liberal bounties be offered for colonial hemp, flax, silk, cotton, bar iron, and timber. A part of England's wealth had been lost in the continental wars because of the large subsidies which were paid, while the adverse balance of trade was draining the country of specie. The mercantilist arguments were once again brought out strongly. If bounties were allowed on raw materials from the colonies, commercial dependence on foreign nations for such materials would cease, and the colonial market for English manufactured goods would be enlarged because the colonists would be able to purchase more from the mother country. Another result of such a policy would be the solution of the future relationship between England and the colonies. With so much land in America, it was logical for the colonists to engage in agriculture and to purchase their manufactured goods from England, but so long as the trade balance was adverse to the colonies, this was impossible. The mercantilists advised an expansion of the bounty policy. Otherwise, they believed that the colonists would be compelled to develop manufactures for themselves, thus competing with England, which in time would lead them to become entirely independent.[60]

[59] 5 George III, c. 45. Under this law, bounties were granted on lumber imported from the colonies into Great Britain.

[60] John Rutherfurd to Earl of Halifax, *Importance of the Colonies to Great Britain,* reprinted in *Some Eighteenth Century Tracts Concerning South Carolina,* pp. 110-121. Rutherfurd pointed out that the commissioners of the navy had proved that Maryland bar iron was equal to the best imported into England from Sweden, and stated that in 1760 England imported 30,000 tons of bar iron from Sweden, 12,000 to 15,000 tons from Russia, and about 1,000 tons from Spain. He concluded: "If this quantity of iron was sent from our colonies, which in my opinion may be brought about in a few years, if ways and means were once fallen upon to get a good many of the poor distressed miners from Saxony to go to North America as servants, and by their means, with the assistance of negroes, lower the price of labor in America, which is the only thing wanted; as now in war time labor is dear in Sweden, where iron costs with all charges,

About 250 merchants and iron manufacturers of London, Birmingham, Wolverhampton, Walsall, and other towns seized the opportunity and petitioned the Board of Trade for bounties on colonial iron.[61] Those of London suggested that a bounty of ten shillings a ton be paid on the importation of colonial pig iron and forty shillings a ton on bar iron from the colonies. To pay the bounty the petitioners asked that the duties be raised on Swedish iron.[62] This immediately called forth a protest from the Sheffield iron and steel manufacturers who stated in a letter to the Board of Trade that Swedish bar iron, especially "Orgroons" (Oregrund) iron, was the best for making steel. They said that in their petitions of eight and fifteen years before they had favored the plan of giving encouragement to American iron. They pointed out that in spite of the removal of the duties from American iron, little was shipped to England, and stated that what was obtainable made poor steel. They therefore opposed the addition of further duties on Swedish iron.[63]

Many interested in the colonies also hoped that bounties would be paid for the production of colonial iron. Thomas Penn wrote:

> The Parliament it is supposed will give a bounty on the importation of Pig and Bar Iron from America, which will be some compensation for what they have raised upon us this and the last Session.[64]

In the last clause he referred to the law making iron an "enumerated" commodity. The question of granting bounties on colonial iron was cut short, as the difficulties which led to the struggle for independence began to increase.

The general impression that bounties were paid on American

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about £12 per ton which formerly in peaceable times used to stand us in but £8 per ton." *Ibid.*, 128-129. See also A. Kennedy, *Observations on the Importance of the Northern Colonies*, p. 35.

[61] Board of Trade Papers: Plantations General, XX, S 49, S 50, S 51, S 52; Journals of the Board of Trade, LXXIII, 117-118, 131.

[62] *Ibid.*, LXXIII, 117-118; Board of Trade Papers: Plantations General, XX, S 49.

[63] *Ibid.*, XX, S 53; Journals of the Board of Trade, LXXIII, 131.

[64] Thomas Penn to Lord Stirling, April 9, 1765, Penn Letter Book, VIII, 241-242.

iron imported by Great Britain is erroneous, for at no time during the entire period were bounties of any sort granted on colonial iron. The duties were finally removed from American pig iron and bar iron, but no further encouragement was given. After 1763 the increased demands of manufacturers in all parts of England for bounties on importations of American iron were due chiefly to the fact that such iron had proved very satisfactory for their purposes. The famous Crowley Works near Newcastle used iron imported from the colonies, but could not secure it in sufficient quantities. Arthur Young wrote of these works: "They use a great deal of *American* iron, which is as good as any *Swedish*, and for some purposes better. They would use more of it, if larger quantities were to be had, but they cannot get it."[65]

The question as to what effect the payment of bounties on colonial iron would have had upon its importation into Great Britain if Parliament had authorized such payments is of course a matter of conjecture. One thing is sure—a small bounty would not have brought the desired results because of the demand in the colonies for iron to be used in manufactures. Inducements, therefore, to American ironmasters to send their pig and bar iron to Great Britain would have necessitated the payment of large bounties. The situation clearly shows that the colonists were beginning to compete with the English industrialists in regard to the production and manufacture of iron.

[65] Arthur Young, *Northern Tour* (1770 Edition), III, 13.

V

REGULATION AND COLONIAL DISOBEDIENCE

Produces, not Manufactures, are the Business of a Colony.—"The Iron Trade of Great Britain Impartially Considered," Penn MSS., XIII, Document 87.

THE first clause of the act of 1750 provided encouragement for the production of colonial iron by permitting pig iron from the American colonies to enter all the ports of Great Britain free of import duties. As the duty on this type of iron was only 3s. 9½d. a ton,[1] the removal of such a low duty should not have been expected to stimulate the shipment of pig iron from the colonies to any great extent. The amount of colonial pig iron shipped to England from the decade of the twenties to the time of the passage of the act averaged about 2,000 tons each year.[2] After the removal of the entire duty in 1750, exports of pig iron slowly, but gradually, increased, with the exception of one lean year. The high peak in the export of pig iron from the colonies was reached in 1771, when a little more than 5,000 tons was sent to England. During the following years there was a decline, until the Revolution cut off all exports to the mother country.

While it is true that after the passage of the act of 1750, the amount of pig iron shipped to England increased to some extent, the total amount exported annually was relatively insignificant when the large amount of bar iron received from foreign countries is taken into consideration.[3] The increase itself must be

[1] This low duty on pig iron had been placed in 1724 at the time of the first shipments of colonial pig iron to England. 11 George I, c. 7; Henry Saxby, *British Customs*, p. 179.

[2] See Appendix B.

[3] No shipments of pig iron entered England from foreign countries during this period. The duties on both pig iron and bar iron from foreign countries

accounted for by the natural growth of the colonial industry during these years, rather than to the policy of encouragement under the act. The half century following the Treaty of Utrecht constituted a period of gradual development in the American iron industry. A more settled mode of living, the growth of population, of towns, and of wealth, with the resultant need and demand for iron wares, brought about industrial activity especially during the years prior to the Revolution.

The act of 1764, which made iron an enumerated commodity[4] and practically forced the colonial producers to send their iron to Great Britain, had only a small effect on the exportation of colonial pig iron to the mother country.[5] Adam Smith stated that the exemption from duties more than counter-balanced the restriction of sales to the British market, and that "the one part of the regulation contributes more to encourage the erection of furnaces in America than the other to discourage it."[6] In theory this might have been true; actually the growth of colonial ironworks after 1750 was not due to British regulation, but to the developing colonial industry, as already pointed out. The relatively small amount of pig iron exported testifies to this, the exemption from a duty of a mere 3s. 9½d. on each ton being of little moment to the colonial ironmasters. This clause of the act, then, must be considered a failure, since it in no way freed Great Britain from dependence upon importations of iron from Sweden, Russia, and Spain.

The second clause of the act of 1750, which permitted the ad-

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were the same, and therefore it did not pay Sweden and other countries to send their pig iron to England. Those who favored the removal of the duties on colonial pig iron had expected that large quantities would be sent from America, which would be refined into bar iron by English forge masters. If this hope had materialized, dependence upon foreign countries for supplies of bar iron would have been lessened, and in time ended.

[4] 4 George III, c. 15.

[5] In 1765, the year after the act was passed, 3,264 tons were received from the colonies; in 1771 a total amount of 5,303 tons of colonial pig iron reached England. See Appendix D. The depression in the industry from 1768 to 1771 was partly responsible for increased exportations during those years.

[6] *Wealth of Nations,* Book IV, Chapter VII, Part 2.

mission of colonial bar iron into England duty free, was seemingly of much greater importance to the colonists than that which referred to pig iron. Before 1750, the duty on bar iron imported into England from foreign countries and the colonies amounted to £2 1s. 6d. if carried in British vessels and slightly more if brought in foreign vessels. The high duty was entirely removed in 1750 on American bar iron sent to the port of London, but such iron could not be carried coastwise or taken more than ten miles by land from London, except for use in the royal navy yards. This gave the colonial forge masters, however, an open market across the ocean for any surplus they might produce, free of all duties, although the market was confined to the metropolis until 1757. In view of the fact that only bar iron was imported from foreign countries, this concession appeared to favor the colonists to a great extent. At the time of the passage of the act it looked as though the doom of the trade in bar iron with Sweden, Russia, and Spain had been sealed, and that in time England would secure from her American colonies all the bar iron needed for her manufactures.

Such was not the case, however. This provision of the act of 1750 did not put an end to the importation of iron from foreign countries. The amount of bar iron sent to England from the colonies before 1750 was indeed insignificant. After the act was passed no immediate reaction occurred. Only five tons of bar iron left the colonies for Great Britain in 1750, five tons in 1751, and eighty-one tons in 1752. During the next four years an average of 270 tons of bar iron were exported to England annually.[7] The immediate results of the act were exceedingly disappointing to those in England, especially in London, who had hoped to profit greatly by the law. The only explanation for the American forge masters not taking advantage of this provision of the act, even though new forges were being built and the output of colonial bar iron was increasing, was that all such iron produced in the colonies found a ready market at home and was used in the manufacture of colonial iron implements, tools, and wares.

In 1757 chiefly through the influence of the British shippers

[7] Board of Trade Papers: Plantations General, XV, O 123; XVI, P 15.

and merchants, as well as the iron manufacturers of Bristol and other cities, all the ports of Great Britain were thrown open to the admittance of colonial bar iron free from the payment of any duties.[8] This concession, likewise, had only a small effect on the exportation of colonial bar iron to England. In 1757 a little more than sixty-nine tons of bar iron reached the ports of England from the colonies; the next year, 355 tons; in 1761, about thirty-nine tons, and in 1763, 310 tons.[9] It is true that the troublesome period of the French and Indian War had some effect on the situation, bar iron being needed for the manifold purposes of war, with the result that little remained for export.

During the years following 1764, more than 1,000 tons of bar iron reached England from the colonies annually. This decided increase over the amount exported in the previous years can be accounted for in two ways. The Peace of Paris of 1763 had brought the war to a close, and there was a lessened demand for bar iron for the purposes of warfare in the colonies, so that iron masters exported a small surplus. The year 1764 also marked the passage of the act which made iron an enumerated commodity, and practically all the iron exported had to be sent to England.[10] During the years that followed there was a gradual increase until 1771 when a little more than 2,200 tons of American bar iron reached England. Economic conditions in the colonies were chiefly responsible for the increased shipments of colonial iron from 1768 to 1771. During these years, which marked the height of the importation of iron from the American colonies into England, there was a serious depression in the colonial iron industry, due largely to the effects of rapid over-expansion and to the inability of ironmasters to obtain a sufficient amount of money to carry on their enterprises. The colonial newspapers

[8] 30 George II, c. 16.

[9] Board of Trade Papers: Plantations General, XVI, P 15; Harry Scrivenor, *History of the Iron Trade,* Appendix, p. 343.

[10] 4 George III, c. 15. Exports of iron from the colonies to all parts of America, Africa, and Asia were still permitted, but the small amounts of colonial iron sent to Portuguese and other European markets were no longer allowed.

for this period contain many advertisements of ironworks offered for sale owing to the "hardness of the times."[11] During the depression many ironmasters shipped some of their iron to Great Britain. The crisis was overcome by the latter part of 1771, with the result that the exportation of colonial iron made a drastic decline.

The part played by American iron in the economy of Great Britain during the eighteenth century was slight. The amount of colonial iron exported, both pig and bar, was relatively small. When compared with the increasing amounts received from foreign countries, it seems even more insignificant. The following figures illustrate the proportion of iron imported by Great Britain from the American colonies and from foreign countries:

	Foreign Bar Iron Only No Pig Iron Imported	*American* Pig Iron	*American* Bar Iron
1761	42,328 tons	2,766 tons	39 tons
1765	50,294 tons	3,264 tons	1,078 tons
1769	46,848 tons	3,401 tons	1,779 tons
1771	43,614 tons	5,303 tons	2,222 tons
1773	45,541 tons	2,937 tons	837 tons
1775	40,771 tons	2,996 tons	916 tons
1776	49,828 tons	316 tons	28 tons[12]

The reason for the failure of this phase of British colonial policy is not difficult to find. The colonists had reached a certain stage of industrial development. They had become interested in their own industries and paid little attention to British attempts to secure markets for raw, or semi-raw material. Such iron as they produced was used for their own needs, with the result of a lessened demand for English iron wares. It should be noted that the legislation which was passed to regulate the colonial iron industry was not the result of a carefully thought-out plan, but instead resulted from the struggle between several groups in England who sought their own ends and had taken advantage of conditions and the exigencies of the time to secure such legislation. The inability of the British to obtain large

[11] *Pennsylvania Gazette,* August 30, 1770, September 13, 1770.

[12] Harry Scrivenor, *History of the Iron Trade,* Appendix, p. 343.

quantities of colonial iron in spite of preference given it over the importation of iron from foreign countries, together with the development of colonial iron manufactures, and the disregard for restrictions placed on certain branches of the iron industry, were signs which pointed the way to the Revolution and to the severance of ties between the two countries.

A consideration of the restrictive phases of the act of 1750 must now be made. Such rolling and slitting mills, plating mills and steel furnaces erected prior to June 24, 1750, were permitted to continue operations. All new works of these types, however, were prohibited. If any should be erected, they were to be condemned as "nuisances" under the provisions of the law. In the years following the passage of the act there occurred the troublesome period of the French and Indian War. During the general turmoil of these years, when British red-coats overran the colonies, there was little desire on the part of American iron manufacturers to erect many of the forbidden mills. It has been thought that the colonists generally obeyed the clauses of the law which placed restrictions on their industry, throughout the entire period. This was not the case, however, for in the decade of the sixties and during the years that followed, the prohibitory clauses of the act were flagrantly disregarded and many interdicted ironworks were established.

Taking Pennsylvania first as an outstanding example of colonial disobedience to the law, many illustrations might be cited to show the attitude of the colonial iron manufacturers from the time of its passage. Under the provisions of the act, a return of all the slitting mills, plating mills, and steel furnaces built before June 24, 1750, whether in operation or not, was required to be made to each Governor, who in turn would report to the Board of Trade. William Branson, a prominent ironmaster of Pennsylvania, owned two steel furnaces—one in Philadelphia, the other on French Creek in the Schuylkill Valley about thirty miles from Philadelphia. A return made by the sheriff of Philadelphia county included his works in Philadelphia, but no mention was made by the sheriff of Chester county of Branson's works there, known as the Vincent Steel Works. This furnace

had been built in 1730,[13] and was still standing when Acrelius wrote in 1757.[14] Whether or not it was in operation in 1750, under the provisions of the law, a report should have been made of its existence.

From about the close of the French and Indian War in 1763, the colonial ironmasters and manufacturers paid little attention to the restrictive clauses of the act of 1750. In Pennsylvania, as in several other colonies, many forbidden ironworks were built. According to entries in the old Potts ledgers, in 1763, Samuel Potts and Company built a steel furnace at Pottsgrove in the Schuylkill Valley, and operated it for many years and throughout the Revolution.[15] Not very far away in the same river valley, but on the other side of the Schuylkill, Thomas Potts and Company erected a steel furnace and openly advertised their steel in a Philadelphia newspaper as "cheaper than English steel," giving purchasers the opportunity of trying it before paying for it.[16] This works also continued in operation for many years after the Revolution.[17] In 1767 Whitehead Humphries advertised steel for sale made at his furnace which was built in 1762[18] at Seventh Street between Market and Chestnut Streets, Philadelphia, a different location from the two steel furnaces for which returns had been made under the act of 1750,[19] and which, under the terms of the law, were permitted to continue in operation.

While ironmasters paid little attention to the restrictions placed upon them, the Provincial Assembly of Pennsylvania showed its utter contempt for the law by discussing the ques-

[13] Potts MSS., B. II, Coventry, 1728 (1728-1734), pp. 214 ff. *passim;* III, 1730 (1731-1732) pp. 132 ff. *passim.*

[14] Israel Acrelius, *History of New Sweden,* p. 16.

[15] Potts MSS., B. XV, Pottsgrove, 1758 (1758-1769), p. 219; XIX, 1765 (1764-1770) pp. 2, 34, 42 ff. *passim.*

[16] *Staatesbote,* November 19, 1764.

[17] East Nantmill Township (Chester County) Rates, *Pennsylvania Archives,* Third Series, XII, 342.

[18] In his appeal to the Assembly for aid in making steel, Humphries stated that he had been engaged in the business for six years. *Pennsylvania Votes of the Assembly,* VI, 200.

[19] *Pennsylvania Chronicle,* December 7, 1767, October 22, 1770, January 21, 1771, November 18, 1771.

tion of giving financial aid to Whitehead Humphries in making steel at his furnace which had been erected in defiance of the law. In 1770, the Assembly finally decided to give him £100 for "encouragement in making steel."[20] In order to prevent this action from coming to the attention of the British government, the action was kept off the law books, and the money was granted to him secretly by means of a certificate signed by the Speaker of the Assembly. In 1772, he was permitted to set up a lottery to assist him in the manufacture of steel.[21] After the outbreak of the Revolution, Congress authorized the Board of War to contract with Humphries for making steel for the Continental artificers from iron made at Andover Iron Works, New Jersey.[22] In 1786, the Assembly of Pennsylvania again granted him aid in the form of a loan of £300 for a period of five years.[23]

Not only was the law of 1750 violated in regard to furnaces for making steel, but many forbidden slitting mills were erected prior to, and during, the Revolution. Joseph and Samuel Potts built a slitting mill before 1775 near Pine Forge in the Schuylkill Valley,[24] George Ege erected another about the same time at Charming Forge,[25] while Mark Bird's slitting mill on the banks of Hay Creek near Birdsboro was in operation during the Revolution.[26] Before the close of the Revolution, because of the lack of sufficient water at Birdsboro, Bird erected a similar plant at the lower fall of the Delaware River, opposite Trenton. It was a large manufacturing plant, having four water wheels for driving machinery for making slit iron and hoop iron, and also

[20] *Pennsylvania Votes of the Assembly,* VI, 228.

[21] *Pennsylvania Chronicle,* October 24, 1772; *Pennsylvania Packet,* October 26, 1772; *Pennsylvania Packet Supplement,* January 18, 1773.

[22] *Journals of the Continental Congress,* X, 56, 65.

[23] *Minutes of the Pennsylvania General Assembly,* 10th Assembly, 2nd Session, pp. 18, 266, 269; *Pennsylvania Statutes at Large,* 1786, c. 1228; *Independent Gazeteer,* April 15, 1786; *Pennsylvania Journal,* April 12, 1786.

[24] Potts MSS., LXX, Pine Forge, 1774 (1744-1781), pp. 78, 109, 130, 170, 188, 249.

[25] Charming Forge, Pennsylvania, Account Book, 1775-1778.

[26] Potts MSS., LXIII, Pine Forge, 1781 (1781-1782), pp. 10, 18.

for rolling round bolt iron from square rods.[27] Another slitting mill was established during this period at Martic Forge.[28]

In New Jersey, also, the law was openly disobeyed. The Governor had reported only one steel furnace erected before 1750, under the provisions of the act of that year.[29] This was the Trenton Steel Works which continued in operation.[30] Yet others were established in New Jersey before the Revolution in direct violation of the law. In 1767, a notice in a London paper under the eyes of the British Parliament heralded the news that a "very extensive steel manufactory" was being carried on at Perth Amboy under the direction of an experienced steel maker from Sheffield.[31] Before 1776 a steel works with "six fires" for making steel by the German method was added by Noble and Townsend to their plant known as the Sterling Iron Works.[32] These works had been assessed by New Jersey until 1774, although the boundary at this point was in dispute between New Jersey and New York. In marking the boundary, a commission decided finally that the property of the Sterling Works was in New York.[33] During the Revolution about 182 men were required to operate the works. The larger proportion of these, however, were employed in cutting the wood and making the charcoal necessary for fuel for the furnace, forges, and steel works.[34]

At least one forbidden slitting mill was erected in New Jersey

[27] S. G. Hermelin, *Report about the Mines in the United States of America,* p. 74. James Wilson, prominent on account of his public services, was Bird's partner in these extensive works.

[28] *Ibid.,* p. 75.

[29] Governor Belcher reported to the Board of Trade one slitting mill and one plating mill in addition to the steel furnace. *New Jersey Archives,* First Series, VII, 258-259.

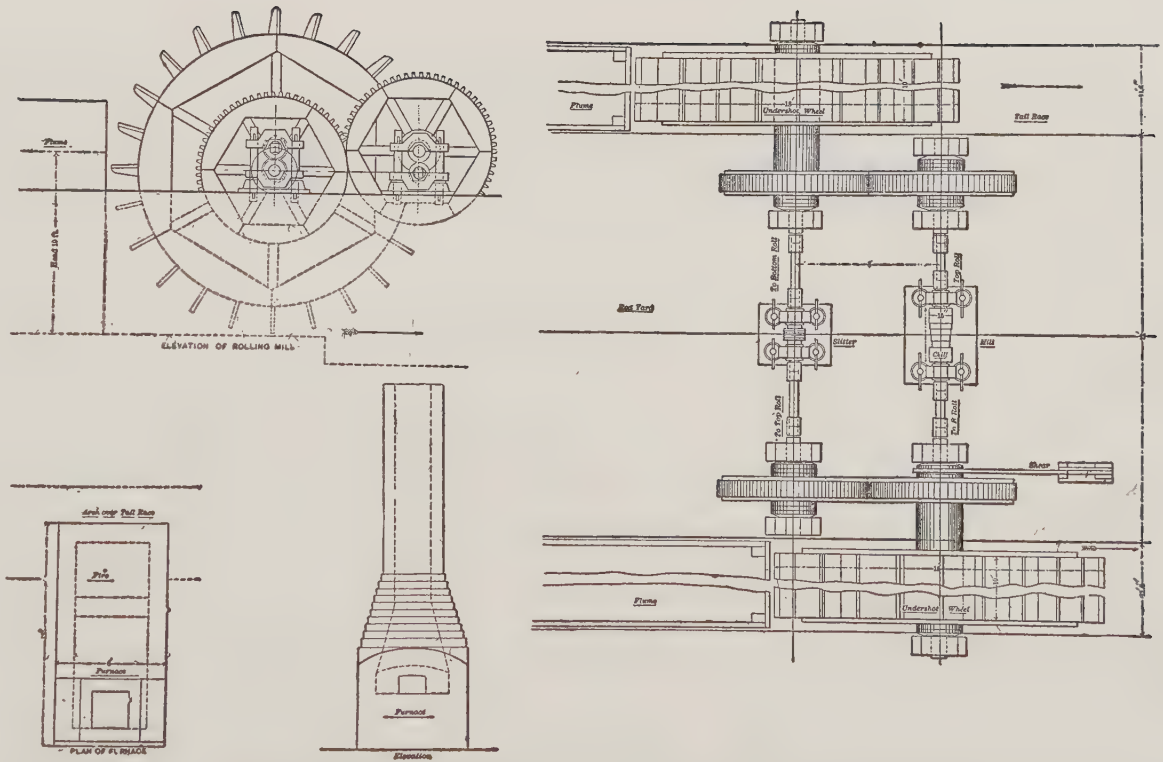
[30] *Pennsylvania Gazette,* August 29, 1765, September 9, 1772; *Pennsylvania Journal,* March 15, 1776.

[31] *Pennsylvania Chronicle,* November 16, 1767.

[32] *New York Gazette and Weekly Mercury,* April 8, 1776. Although the German process of making steel differed somewhat from the English method, the law prohibited the erection of "every Furnace for making Steel."

[33] *Documents Relative to the Colonial History of New York,* VIII, 337, 349.

[34] Macgrane Coxe, *Sterling Furnace and West Point,* pp. 3 ff.



PLAN OF ROLLING AND SLITTING MILL, MIDDLEBORO, MASSACHUSETTS

Built about the Middle of the Eighteenth Century

before 1770. This was near Boonton and was owned by Samuel Ogden. He advertised openly for nail makers for his nailery, which was operated in connection with his slitting mill,[35] and even advertised tire iron that was manufactured there.[36] Allen and Turner, who operated the Union Iron Works, which included a slitting mill erected before 1750 and reported under the provisions of the law, notified Governor Franklin of the existence of their competitor's works. Ogden defied the Governor, who was not sure just what action he should take. If he did not inform the Board of Trade, he was afraid that the proprietors of the Union Works might do so.[37] No action, however, was taken against Ogden at this time, and the works continued in operation throughout the eighteenth century.[38] Before the close of the Revolution, there were four rolling and slitting mills in New Jersey, the two already mentioned, one at the Batstow Iron Works, and another near Morristown.[39]

The law was also violated in New England. In the old town of Dorchester, a slitting mill was built and put into operation in 1769.[40] Another was established at Enfield about 1773.[41]

[35] *New York Gazette and Weekly Mercury,* July 15, 1771.

[36] *Ibid.,* December 28, 1772.

[37] William Franklin to Benjamin Franklin, 1770, Papers of Dr. Franklin, Miscellaneous and Letters, LVIII, Document 44.

[38] A one-third interest in the Boonton Slitting Mills was offered for sale in 1780. *New Jersey Journal,* March 29, 1780. Cazenove visited the mills in 1794 and described them in his *Journal,* pp. 6 ff.

[39] S. G. Hermelin, *Report about the Mines in the United States of America,* pp. 71-72.

[40] W. B. Weeden, *Economic and Social History of New England,* II, 734. The reports of the Governors of Massachusetts regarding slitting mills, plating mills, and steel furnaces were never complete. In 1750, two slitting mills and two plating mills were reported to the Board of Trade. Colonial Office Papers, 5:886. In 1758, only two slitting mills were mentioned in the report, although a fairly complete list of furnaces and forges was sent. *Ibid.,* 5:889. There were many other works of the restricted types in Massachusetts which were never reported. See W. B. Weeden, *Economic and Social History of New England,* II, 683. In 1774, John Adams stated that the restrictive clauses of the iron act of 1750 had never been executed in Massachusetts, and that the act relating to the manufacture of beaver hats had never been regarded there. "Novanglus," in *Works,* IV, 49.

[41] J. L. Bishop, *History of American Manufactures,* I, 491.

About this time, Edmund Quincy petitioned Parliament for permission to establish a steel furnace and a tilt hammer in New England. He claimed to have found ores suitable for making steel on his estates, and planned to form a company with some residents of Great Britain. His request was violently opposed by the steel makers of Bristol, and Parliament refused.[42]

There can be no doubt that many forbidden works were established of which no record remains. Just prior to the Revolution, iron manufactures had developed to a considerable extent in the colonies. Steel was used for making the better grades of tools. Cast-iron wares, tools, and utensils of all kinds had become articles of commerce, the northern colonies supplying those of the south.[43] Slitting mills were coming to occupy an important position because of the demand for slit iron used in making nails. At these mills, small sizes of bar iron were heated and rolled into ribbons of iron which were cut at the slitting rolls. Slit iron and rods could be purchased at almost all stores, and even farmers during their spare time engaged in the occupation of making nails which they used in constructing buildings and for other purposes.[44] Plating forges also could easily have been operated under the same roof as bar-iron forges. Undoubtedly this was the case, for many advertisements of sheet iron and sheet-iron wares may be found in the newspapers.[45] Since it only required a hammer of a different type from the regular refinery forge hammer, it was a very simple matter to violate the law in this respect.

One of the reasons for the disregard of the restrictive clauses of the Act of 1750 was the lack of means for its enforcement. A member of Parliament pointed this out at the time of the passage of the act. The Governors had to *order* and also *cause* such a mill erected in defiance of the law to be pulled down. No directions were given as to what officers of the law should do it.

[42] *Journals of the House of Commons,* XXXIV, 93, 147, 149.

[43] See Chapter VI.

[44] W. B. Weeden, *Economic and Social History of New England,* II, 499-500, 734.

[45] There can be little doubt that Samuel Ogden had a plating mill in connection with his forge and his illegal slitting mill. See advertisement in *New York Gazette and Weekly Mercury,* December 28, 1772.

"And whosoever they [the governors] order to do it," states this writer, "is at liberty, whether to obey or not. For the Bill lays no Penalty on him, if he refuses; but if he do's refuse, All that is left is that the Govr. himself must go in a very short time to the Mill &c. though it bee two or three hundred Miles from the Seat of Government, & must with his own proper Hands pull down any such Engine or Furnace [which is a Matter quite new in its Kind] or else, must suffer the great Pains and Penaltys to be inserted in the Bill."[46]

When the violation of the law by Samuel Ogden was pointed out to Governor William Franklin he was not sure what procedure he should take. Ogden himself defiantly told the Governor that nothing could be done to his slitting mill until it "should be judged by a legal Process." The Governor wrote to Benjamin Franklin for counsel in the matter, stating that he believed the law ought to be repealed, but until it was, he felt it to be his duty to make an attempt to enforce it.[47] However, under the provisions of the act there was little that he could do.

At the outbreak of the struggle between the colonies and the mother country, the Revolutionary Conventions held in Pennsylvania and other colonies passed resolutions urging the promotion of manufactures of various kinds, including steel, wire, and nails, and suggesting plans for their encouragement.[48] The Maryland Convention in 1775 and 1776 authorized the Council of Safety to lend money to certain ironmasters to carry on their furnaces for the purpose of casting cannon. Loans were also made, without interest, for erecting rolling and slitting mills.[49] The Convention sitting in Virginia urged the promotion of manufactures including nails, wire, and especially steel. It defied the act of Parliament which prohibited the establishment of plating and slitting mills. A resolution passed in August 1775 stated:

[46] "Considerations on the Bill to Encourage the Importation of Iron from America," Penn MSS., XIII, Document 75.

[47] William Franklin to Benjamin Franklin, 1770, Papers of Dr. Franklin, Miscellaneous and Letters, LVIII, Documents 44, 80.

[48] *American Archives,* Fourth Series, I, 1171.

[49] *Proceedings of the Conventions of Maryland, 1774, 1775, and 1776,* p. 85; *American Archives,* Fourth Series, VI, 1467, Fifth Series, I, 1349.

"That in case the British Ministry shall attempt to enforce the act of parliament for preventing the erection of plating and slitting mills in America, this Convention will recompense to the proprietors of the first two of such mills as shall be finished and set to work in this Colony all losses they may respectively sustain in consequence of such endeavors of Administration."[50]

In North Carolina, the Provincial Congress adopted resolutions for the encouragement of manufactures and also made provision for the granting of bounties, especially on munitions and materials of war. In September 1775 it offered £250 to the first person erecting a slitting mill, and £200 to the second. To the first who should erect a steel furnace for producing steel equal to Bristol steel £100 was promised, and £25 for the second. The sum of £500 was the inducement granted to anyone building an air furnace, and various sums were pledged for the encouragement of other manufactures.[51]

The events at Lexington and Concord were heeded also in South Carolina. The Provincial Congress there, in 1775, offered £1,000 as a bounty for the erection of a bloomery just as soon as it produced the first ton of good iron. For the second and third forges of the same type, the sums of £800 and £700 respectively were to be granted. The making of steel was encouraged by a reward of £500 for each of the first three steel works erected, after the production of 500 pounds of steel. The sum of £700 was pledged to the first person or persons establishing a rolling and slitting mill in the colony, after the first 1,000 pounds of nail rods were made. As in other colonies, bounties and premiums were given for the manufacture of guns, munitions, and other war materials.[52]

In the fateful year 1776, the Continental Congress recommended to the assemblies, conventions, and councils of safety of the states that they establish societies for the improvement of "agricultural arts, manufactures and commerce," as soon as pos-

[50] *Proceedings of the Virginia Convention, August 26, 1775,* p. 26.

[51] *American Archives,* Fourth Series, III, 209-212, V, 1338; *North Carolina Colonial Records,* X, 216-219.

[52] *American Archives,* Fourth Series, IV, 72-73, V, 590.

sible. It also recommended that ways and means be considered to aid and encourage the manufacture of needed materials such as sailcloth and steel.[53] The policy of granting bounties to encourage manufactures was continued by the states. Rhode Island in 1777 provided for a bounty of £60 per gross ton for "steel of the best quality, or equal in goodness with the best German steel," made there during the next three years.[54] Massachusetts and other states granted bounties on "good merchantable card wire" made from American iron. The policy of granting loans for the encouragement of manufacturing was extended throughout the Revolution.

The struggle with the mother country gave a decided impetus to iron manufacture and throughout the Revolution the American iron industry was in a very prosperous condition. Scattered from New England to the Carolinas, flaming blast furnaces turned out instruments of war, as well as the materials for implements of peace. Even in many places near the frontier, at night, the almost smokeless flames from furnaces cast a lurid glare upon the sky, visible for miles around, illuminating the casting sheds and other buildings, and also the surrounding forests.[55] From the top of furnace stacks streams of sparks were occasionally emitted as the flames rose and fell, while the intermittent roar of the forced blast could be heard a long distance away. At the forges where the pig iron was refined and hammered into blooms, or bars of wrought iron, the dull, unvaried turning of the water wheel, the rhythmic thump of the giant hammers, and the droning sound of anvils denoted industrial activity. At the slitting mills, where could be heard the clatter of bars passing through the slitting rolls, and the groaning of spindles and shafts as they were turned slowly in their housings by powerful water

[53] *Journals of the Continental Congress,* IV, 224.

[54] *Records of the Colony of Rhode Island,* VIII, 240.

[55] During the Revolution, ironworks were built on the frontier in Pennsylvania as far west as Fort Loudon in the Cumberland Valley. Before the close of the eighteenth century, a blast furnace and a forge were built in the Ohio country in anticipation of the needs of settlers who were moving into that region after Anthony Wayne's victory over the Indians at Fallen Timbers in 1794. *Pittsburgh Gazette,* February 2, 1799.

wheels, quantities of iron were prepared for the manufacture of nails. In every village and town, blacksmiths and workers in iron were busy making weapons of warfare, as well as tools, implements, and manufactures of all kinds from bar iron.

The few years following the Peace of 1783 were years of depression and it was natural that iron manufacture should also suffer. However, the period following 1787 was one of prosperity and expansion along all lines. The iron industry proceeded with fresh vigor and developed rapidly. Manufactures progressed unrestricted. The seventy-six iron works in Massachusetts at the close of the Revolution increased rapidly in number. In New Jersey in 1789 there were eight blast furnaces, seventy-nine forges and numerous ironworks of other types.[56] Pennsylvania was the foremost of all the states in the production and manufacture of iron, as well as many other manufactures.[57] This state, however, had established her leadership in American iron production before the colonial period had closed. Now, during the troubled period following the close of the Revolution, Pennsylvania's first concerted protectionist movement had its origin, and the Pennsylvania tariff of 1785 became the model for the federal tariff of 1789. It was estimated that when the new republic was launched under the Constitution, most of the 4,000,000 pounds of nails used in the United States annually, and half the steel needed in manufactures, were made in this country. Only small amounts of pig iron and bar iron were exported; quantities were imported from England, Russia, Sweden, and elsewhere. This iron together with most of the iron smelted at the furnaces and hammered into bars at the forges constituted the material used in the manufacture of tools, implements, and iron wares.[58] By the close of the eighteenth century industry in the United States had made remarkable progress and a solid foundation for the future industrial greatness of this country had been laid.

[56] Tench Coxe, *View of the United States,* p. 144.

[57] *House Executive Documents,* 22 Cong., 1 Sess., No. 308, II, 833 ff.; Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Chapter VIII.

[58] Tench Coxe, *View of the United States,* pp. 144-145.

VI

STEPS LEADING TO THE REVOLUTION

> We must not think that the North Americans, who have a watchful Eye over our Proceedings, and are greatly jealous of their Liberty will suffer their Properties and Interests to be misapplied.—N. Ray, *The Importance of the Colonies of North America,* p. 13.

THE attitude of the colonists toward the restrictions on certain types of ironworks, at the time the act was passed in 1750, has been noted. It was with much apprehension as well as opposition that ironmasters and others regarded this attempt to prevent the development of iron manufactures. Opposition to the restrictions placed in 1750 appeared again during the troublesome years preceding the Revolution. In 1770 Joseph Borden, of Bordentown, New Jersey, in writing of the injustices done to the colonists through the Townshend Acts stated: "You will *Remember* they *past* an Act to prevent our *sliting* Iron and making Steel that made a little Noise for a while but past over."[1] John Dickinson, the self-styled Pennsylvania farmer, who had a financial interest in Elizabeth Furnace, Pennsylvania,[2] the project of the erratic Henry William Stiegel, wrote in one of his letters to the colonists:

> Great Britain has prohibited the manufacturing *iron* and *steel* in these colonies, without any objection being made to her *right* of doing it. The *like* right she must have to prohibit any other manufacture among us. Thus she is possessed of an undisputed *precedent* on that point. This authority she will say, is founded on the *original intention* of settling these colonies; that is, that she should manufacture for them, and that they should supply her with materials. . . . We have been prohibited, in some cases, from manufacturing for ourselves; and may be prohibited in others. We are therefore exactly in the situation of a city besieged which is surrounded by the works of the besiegers in every part *but one*. If *that* is closed up, no step

[1] *New Jersey Archives,* First Series, XXVII, 255-256.

[2] Henry W. Stiegel to John Dickinson, June 24, 1771, Logan Papers, XXXVIII, Document 87.

can be taken, *but to surrender at discretion.* If *Great Britain* can order us to come to her for necessaries we want, and can order us to pay what taxes she pleases before we take them away, or when we land them here, we are as abject slaves as *France* and *Poland* can shew in wooden shoes and with uncombed hair.[3]

Another writer stated that the very title of the statute showed how jealous Parliament was of manufacturing in the colonies, especially those manufactures which competed with British.[4] Thus from the time of the passage of the act in 1750, many colonists felt the injustice of the restrictions.

There was much objection also to the act of 1764 which made iron an "enumerated" commodity.[5] It brought a protest from one writer who exclaimed: "A colonist cannot make a button, a horse shoe nor a hob-nail, but some sooty ironmonger or respectable button maker of Britain shall bawl and squawl that his honor's worship is most egregiously maltreated, injured, cheated and robb'd by the rascally American republicans."[6] John Dickinson also objected to the enumeration of iron, chiefly because it could not be sent into Ireland.[7] He stated that

[3] John Dickinson, *Letters from a Farmer in Pennslyvania* (1768 Edition), p. 12.

[4] Adam Anderson, *Origin of Commerce,* III, 279; David MacPherson, *Annals of Commerce,* III, 280.

[5] 4 George III, c. 15.

[6] *Boston Gazette,* April 29, 1765. This had appeared earlier in a London newspaper.

[7] Dickinson wrote: "Many remarkable instances might be produced of the extraordinary inattention with which bills of great importance, concerning these colonies have passed in parliament; which is owing, as it is supposed to the bills being brought in by the persons who have points to carry so artfully framed, that it is not easy for the members in general, in the haste of business to discover their tendency.

"The following instances show the truth of this remark. When Mr. *Greenville,* in the violence of reformation formed the 4th George III, Chap. 15th, for regulating the *American* trade, the word *"Ireland"* was dropt in the clause relating to our iron and lumber, so that we could send these articles to no part of Europe, but to *Great Britain.* This was so unreasonable a restriction and so contrary to the sentiments of the legislature for many years before, that it is surprising that it should not have been taken notice of in the house. However the bill passed into a law. But when the matter was explained, this restriction was taken off by a subsequent act." (5 George III, c. 45.) John Dickinson, *Letters from a Farmer in Pennsylvania,* pp. 33-34.

with the increasing British restrictions, the colonists soon would not be allowed to make "an ax for cutting firewood, nor a plow for raising their food."[8]

The attempt to prevent the manufacture of all iron wares in the colonies dates back to the first struggle in 1717-1719 when the Naval Stores Bill was drawn up. The general opinion, in spite of the petitions of the London ironmongers and manufacturers, was expressed by a writer that such a prohibition "would bear hard on the common Rights and liberties of mankind."[9] On the other hand, however, the mercantilists, in accord with their cleverly spun arguments, continued to demand that colonial iron manufactures be suppressed and that encouragement be given to the production of colonial pig iron and bar iron. Joshua Gee, for instance, who was exceedingly anxious during the early years of the struggle to have the duties taken off American pig iron and bar iron, and even encouraged to the point of paying large bounties, was very active in this respect, and suggested to the Board of Trade that restrictions be placed on iron manufactures in the colonies so that there would be no interference with the manufactures of England.[10] By 1737 Joshua Gee, whose chief interests were now centered, not in the colonies, but in iron manufacture in Shrewsbury, England, vigorously opposed even the manufacture of bar iron in America. Owing to his knowledge and grasp of conditions in the colonies, he could see clearly the advances which were being made there. Testifying before a Parliamentary committee in 1737-1738, he stated:

> That if the *Americans* are suffered to make Bar Iron, it may be impossible and unreasonable to hinder them from manufacturing also; because the Carriage from their Forges to the Sea-ports, the Stowage, Port, and Shipping Charges, the Profit of the Vender there,

[8] *Ibid.*, p. 29. James Otis also asked: "Is there anything in the laws of nature and nations, anything in the nature of our allegience that forbids a colonist to push the manufacture of iron much beyond the making of a horse shoe or a hob nail?" *Considerations on Behalf of the Colonists,* p. 22-23.

[9] *Reasons against a General Prohibition of the Iron Manufactures in His Majesty's Plantations,* reprinted in American Historical Association, *Annual Reports,* 1892, p. 56.

[10] Journals of the Board of Trade, XXVIII, 97-98.

the Charge of the Freight to *England,* the Risk of the Sea, the several Profits of the Buyers here, the Carriage to the Manufactories in the midland Parts of this Kingdom, the Re-carriage back again to the Sea-ports, the Profits of the Ironmonger and Merchant on Exportation, the Charges of Freight, and the Risk of the Sea back again to *America,* with other incidental and contingent Charges, will ever remain unsurmountable Obstacles to their sending Bar Iron into this Kingdom to be manufactured.

That if their Forges and Manufactures are suffered to increase in the manner they now do, they will constantly drain this Kingdom of great Numbers of our People; which, as our Works of all Kinds must decline here, Want of Work at home, and a Prospect of higher Wages under new Masters abroad, they will be continually going from us to them, to the great Depopulation of their Mother Country.[11]

By the time the act of 1750 went into effect, in spite of opposition on the part of English manufacturers and merchants, and contrary to mercantilistic theories, iron manufactures were well developed in the colonies. The act placed no restrictions on converting the bar iron made at the forges into any kind of iron wares. The prohibitory clauses were but a weak attempt to curb manufactures of certain kinds, especially those of steel, sheet iron, and nails, which were beginning to interfere to a great degree with the manufactures of the mother country.

If the Board of Trade had received complete reports from the colonial Governors of the number of furnaces and forges being established in the colonies, it could have formed some idea of the extent of iron manufactures there, since only relatively small amounts of colonial pig iron and bar iron were exported. After 1750 the Board of Trade continually requested the Governors to report the extent of the iron industry in their respective colonies, together with the amount of iron made annually.[12] When reports were made at all, they were usually incomplete. For instance, Governor Denny in 1757 reported the amount of iron made at eight Pennsylvania forges, stating that there were two more in the province which had not sent returns to him.[13]

[11] *Journals of the House of Commons,* XXIII, 113.

[12] Journals of the Board of Trade, LXII, 40; LXV, 169, 171-172, 282; LXVIII 24, 42; LXXII, 140, 157.

[13] Board of Trade: Proprieties, XX, W 24, W 25.

At this time, instead of ten forges, there were at least thirty in the colony.[14]

When William Pitt came into power during the Seven Years' War, he was greatly interested in the extent of the colonial iron industry. He asked the Board of Trade for copies of the returns respecting the forbidden iron mills, made by the colonial Governors under the Act of 1750.[15] Pitt was entirely opposed to any manufacturing whatever—of even a horseshoe, to use his own expression—in the colonies. In his speech during the debates on the Stamp Act in 1765 he stated: "This kingdom as the supreme governing and legislative power has always bound the colonies by her regulations and restrictions in trade, in navigation, in manufactures. . . . We may bind their *trade*, confine their *manufactures*, and exercise every *power* whatsoever, except that of taking money out of their pockets without their consent."[16]

The seriousness of the situation between the mother country and the colonies following the passage of the Stamp Act and its repeal, prompted the Board of Trade to demand reports from the Governors in 1766 and 1768 in regard to all manufactures established in the colonies since 1734.[17] Maryland had been one of the few colonies up to this time that had sent fairly accurate reports of the extent of the iron industry there. In 1762 the Governor of that colony reported eight furnaces and

[14] The Board asked for the number of furnaces as well as forges established before 1757. *Pennsylvania Archives,* First Series, III, 273-274. The report made by Governor Denny was incomplete in regard to the number of forges and no mention was made of furnaces or any other types of ironworks. For a list of Pennsylvania furnaces and forges and dates of their establishment see Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Appendix. In his report of 1758 concerning the Massachusetts iron industry, Governor Pownall of Massachusetts wrote: "The People since the late Act restraining the Number of Slitting Mills are extreamly jealous of these kinds of Inquiries." Colonial Office Papers, 5:889.

[15] Board of Trade Papers: Plantations General, XV, O 149.

[16] W. Cobbett; *Parliamentary History of England,* XVI, 103-108. During the course of this debate Grenville stated: "When I had the honor of serving the crown while you were loaded with an enormous debt, you have given bounties on their lumber, on their iron, their hemp and many other articles." *Ibid.,* XVI, 102. Bounties had been given on hemp (4 George, c. 26), and on lumber (5 George III, c. 45), but none on iron.

[17] British Museum, King's MSS., No. 205.

ten forges in operation, and also the amount of iron made annually.[18] In reply to the demand of the Board in 1766, Governor Sharpe stated that no manufactures of any consequence had been established there since 1734. "There are indeed," he said, "several Iron Works erected in different parts of the Province." He minimized, however, the extent of all manufactures.[19]

The reply of Governor John Penn of Pennsylvania when asked by the Board of Trade to give "a particular and exact account" of the several manufactures which had been set up and carried on in his colony since 1734,[20] is typical of most of the reports of the Governors at this time. Penn stated that no public encouragement had ever been given to manufactures, and that only two "manufactories" had ever been set up in the province. One had been attempted in 1763, he said, when works for making sailcloth, ticking, and linen had been established by private subscription in Philadelphia. Owing to the high price of labor and the impossibility of competing with Great Britain, the project had to be given up. The other, he continued, was in glassworks established about four years before in Lancaster county. This works supplied a small portion of the farmers in the vicinity with an inferior quality of glass.[21] Like many other Governors, he concluded: "If any Manufactories should hereafter be set up within this Province your Lordships may depend on my care to Transmit you an Account of the same as I am acquainted therewith."[22] Although the Board of Trade was anxious to know the extent of the iron industry which it suspected at this time was in a flourishing condition, Governor Penn made no mention of it in his report. In addition to the iron industry, there were many

[18] Board of Trade Papers: Proprieties, XXI (I) X 8.

[19] *Ibid.*, XXII, Y 18.

[20] Board of Trade to Governor John Penn, August 1, 1766, *Pennsylvania Colonial Records*, IX, 343.

[21] Stiegel glass made during this period is sought after by collectors today. It is not in any way inferior to the best glass made today and possesses some excellent qualities. See F. W. Hunter, *Stiegel Glass*.

[22] Governor John Penn to Board of Trade, *Pennsylvania Colonial Records*, IX, 353-354.

manufactures of various kinds such as stockings, guns, and textiles, which were carried on to a great extent in Philadelphia, Germantown, Lancaster, and in many other places.[23] These were not mentioned in the report to the Board of Trade.

The reports of the other Governors were indefinite and vague. Governor Bernard of Massachusetts replied to the demand of the Board for an annual account of manufactures: "I do not think it necessary to send an annual account where I have nothing to inform of."[24] A short time before, Governor Colden of New York wrote to the Board giving a very unfavorable account of the conditions of manufactures in that colony and stated: "What has been published of the Manufactures lately set up are absolute falsehoods, and yet they are known to be such."[25]

Benjamin Franklin wrote to his son, Governor William Franklin of New Jersey, in 1768, that the reports to the Board of Trade were all of the same strain—that there were no manufactures of any consequence in the colonies, and that this information had been received with much satisfaction in England. He suggested to his son that he send another report before Parliament opened, but that he include in his account of manufactures only a glass plant for coarse window-glass and bottles, besides a small amount of domestic manufactures of linen and woolen goods.[26] Governor Franklin did not follow the advice of his father and was one of the very few Governors to give a fairly accurate account of the iron industry in his colony.[27] He did not discuss, however, the various forms of iron manufacture, only giving the number of furnaces and forges in New Jersey.

[23] P. Kalm, *Travels into North America,* I, 70; A. Burnaby, *Travels through the Middle Settlements in North America,* p. 93. *Hubley Papers,* Lancaster County Historical Society, *Papers,* II, 242.

[24] British Museum, King's MSS., No. 205.

[25] "State of the Province of New York," *Documents Relative to the Colonial History of New York,* VII, 799.

[26] Benjamin Franklin to William Franklin, March 16, 1768, *Works of Benjamin Franklin,* V, 116-117.

[27] Governor Franklin to Secretary Hillsborough, June 14, 1768, *New Jersey Archives,* First Series, X, 31.

After 1768 the Board of Trade did not receive any real information of colonial manufactures of any kind. In 1773, the Earl of Dartmouth wrote once again to Governor John Penn, this time stating that the accounts of the Governors were not as full or explicit as they should be, and asked for specific and complete information in regard to Pennsylvania.[28] Penn did not reply for two years, and when he did, he completely ignored the question of manufactures. As to mines, he said: "There are no Mines in this Province, except those of Iron Ore, tho' in two or three parts of it, there have been found some Appearances of Copper Mines."[29] At this time there were dozens of ironworks in the Schuylkill, Delaware, Lebanon, and Susquehanna Valleys. At night the flames of the blast furnaces could be seen in many parts of the province, and the dull thud of forge hammers could be heard in many places. There were in the colony hundreds of blacksmith shops, large and small, where bar iron was manufactured into a variety of needed articles. If Penn's incomplete reports were due to ignorance, he could not have traveled very far in his colony, but his reports show his contempt toward the inquiries of the Board and his resentment against imperial restrictions.

The question of the progress of American manufactures was debated in the British newspapers after the outbreak of hostilities. One correspondent to a London paper asked whether the blacksmiths and other workers who had left England for the colonies had lost their skill on the journey across the ocean. "What danger," he wrote, "may be in sending an army of manufacturers into America! May not Manchester, Birmingham and other towns repent when the arts are flown?"[30] Most Englishmen, however, believed that colonial manufacturing was of little consequence. Many thought that if Pitt was returned to power he could persuade the colonists to renounce their claim of independence and direct their attention to agriculture, so that

[28] Earl of Dartmouth to Governor John Penn, July 5, 1773, *Pennsylvania Archives*, First Series, IV, 464.

[29] Governor John Penn to Earl of Dartmouth, January 30, 1775, *Ibid.*, IV, 596-597.

[30] *London Chronicle*, March 10, 1778.

they would not wish to make even a horseshoe.[31] Others, like trueborn Englishmen, said that the "spirit of manufacturing" could never be "incorporated, as it were," into the lives of the Americans, who were an agricultural people.[32] This self-complacency and self-satisfaction on the part of Englishmen with their own achievements in manufacturing, even on the eve of the Industrial Revolution, did much to prevent them from seeing the rapid strides being made along similar lines by the Americans.

There were a few Englishmen engaged in the British iron industry who sympathized with the Americans because of the restrictions which Parliament had placed on their manufactures. One who visited the colonies prior to the Revolution and saw the high development reached in iron manufactures wrote:

> I have viewed with particular pleasure several spirited efforts for their establishment in the different provinces on the continent, particularly in *Pennsylvania,* and doubt not, but by proper encouragement, perseverance and industry, *American* freedom and happiness will be thereby founded on such a basis, as not to be removed by any future Resolve or Act of their virtual Representatives on the other side of the *Atlantic*—for I will venture to say, (in opposition to Lord *Chatham's* assertion in the British Parliament) that Great Britain has NO right to *restrain the manufactures of the colonies in any case whosoever.*[33]

This writer praised the efforts of the colonists to produce steel, and stated on the authority of an expert that some of the steel produced in the colonies was equal to that produced at the famous Crowley Steel Works in England.

Although the chief characteristic of the colonial iron industry was its scattered nature, certain regions had become highly industrialized long before the Revolution. Massachusetts was a center of iron manufacturing and not only manufactured its own iron, but imported pig iron and bar iron from other colonies,[34] as well as steel and tin-coated sheets from England.[35] The

[31] *Ibid.,* January 17, 1778.

[32] *Ibid.,* March 17, 1778.

[33] *Pennsylvania Chronicle and Universal Advertiser,* April 6-13, 1772.

[34] Israel Acrelius, *History of New Sweden,* pp. 166-167.

[35] John Mein, *A State of Importations from Great Britain into the Port of Boston for 1770,* pp. 4-86, passim.

Schuylkill Valley in Pennsylvania was another industrial region, having a large number of furnaces and forges concentrated there.[36] The Egg Harbor River district of southern New Jersey and also Morris county in the northern part of the same colony were other industrial centers. About the beginning of the Revolution, Washington estimated that there were "between eighty and a hundred iron-works, large and small" in Morris county alone.[37]

The rapid development of colonial manufactures of iron has not been given a proper place in American economic history. Most of the bar iron made in the colonial forges was manufactured into articles of various kinds. While varying amounts of bar iron were exported to England from time to time, small amounts of British, Swedish, and Russian iron reached the colonies. For the three years from 1746 to 1749, more than 243 tons of bar iron were exported from Great Britain to the colonies to be used in manufactures.[38] From this time on, Swedish iron especially was sent by way of the mother country to the New World.[39]

American iron manufacturers were progressive. Tools made in the colonies were in general far superior to those produced in England. Attempts were made to account for the difference. Colonel Dunbar, in 1730, wrote that "in England they steel and make a tool at 3 or 4 heats at most, but here never under 11 or 12 heats, and besides the goodness caused by this, they make their tools here of double the Substance."[40] American scythes were often preferred to English.[41] Among the improve-

[36] Arthur C. Bining, *Pennsylvania Iron Manufacture in the Eighteenth Century,* Chapter IV.

[37] George Washington to Richard Henry Lee, April 24, 1777, *Writings of George Washington,* IV, 397.

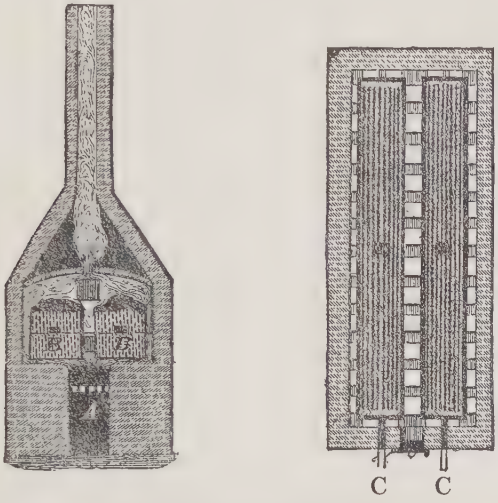
[38] House of Lords MSS., No. 185.

[39] S. G. Hermelin, *Report about the Mines in the United States of America,* pp. 11, 16. According to Lord Sheffield, Great Britain sent "Russian, Swedish and British iron to a great amount, particularly to the northern colonies." Lord Sheffield, *Observations on the Commerce of the American States,* p. 118.

[40] Col. David Dunbar to Secretary Popple, August 19, 1730, *Baxter Manuscripts,* Maine Historical Society, *Collections,* Second Series, XI, 41.

[41] *Interest of Great Britain in Supplying Herself with Iron,* p. 16.

ments made before the Revolution in the production of nails was the invention of a process to cut nails by machinery instead of the old method of making them one at a time by hand.[42] While the importation of iron wares from England continued, such articles had to compete with those made in America.



BLISTER STEEL FURNACE

A—Fire-grate.
B—Cementation-boxes.
C—Orifices for drawing out proof-bars.

It was natural that the northern colonies should lead in the development of manufactures, because in resources, soil, and climate, they were to a great degree a counterpart of the mother country. Therefore they did not fit snugly into the mercantile ideal. This may be clearly seen in the unsuccessful attempt to secure sufficient supplies of colonial naval stores in order to free England from dependence for such materials upon the Baltic regions, even though bounties were granted.[43] From the very beginning of the development of colonial manufactures, several of the northern colonies attempted to discriminate against Eng-

[42] Maine Historical Society, *Collections*, Second Series, X, 7.

[43] W. B. Weeden, *Economic and Social History of New England*, II, 555-556.

lish goods. For instance, Massachusetts several times imposed higher duties on certain types of manufactured commodities from England than on colonial articles of a like nature, and in 1718 legislation was adopted which provided that imports from Great Britain should pay double the duties imposed on similar goods from the other colonies.[44]

As early as 1677 Sir Josiah Child, noting the rising manufactures of New England, called that section of the country "the most prejudicial Plantation to the Kingdom of England." During the eighteenth century, his observations in regard to competitive manufactures might have been applied to all the northern colonies.[45] It was inevitable that manufactures should have developed in the north because of conditions which were favorable, including abundance of raw materials, suitable water power and fuel, together with the increasing demand for manufactured goods, and isolation from England and the rest of the world. Difficulties were encountered in obtaining capital to promote manufactures and also in securing a sufficient supply of skilled labor, but if these difficulties had been entirely overcome, manufactures would have developed even more rapidly.

The southern colonies, on the other hand, fitted much better into the scheme known as the mercantile system. This was true of the production of iron as well as of naval stores. By far the largest part of colonial iron sent to the mother country was made in Virginia and Maryland.[46] Manufactures developed slowly in these colonies. It should be kept in mind, however, that in addition to many conditions which did not favor manufacturing, several large enterprises in these two colonies had been established

[44] *Acts of the Privy Council, Colonial Series*, 1680-1720, pp. 759-760. This act, like earlier ones, was disallowed by the Privy Council, and notice was served on the Massachusetts Assembly that the "laying of any Discouragements on the Shipping and Manufactures of this Kingdom may endanger their Charter."

[45] Sir Josiah Child, *New Discourse of Trade*, pp. 193, 229-234.

[46] See Appendices B and C. It should be noted that a portion of the iron credited to Virginia and Maryland on the Custom House books was made in Pennsylvania, for shipments of iron were sent down the Susquehanna River from ironworks near that river to shipping points on the Chesapeake Bay.

for the definite purpose of furnishing England with iron for her manufactures. This was true of the projects of Spotswood and his partners, and also the Principio Company, as well as other companies which operated largely on British capital.

Throughout the eighteenth century, the northern colonies developed a commerce in manufactured goods, including iron wares of all kinds, with the plantations of the south. While statistics are difficult to obtain, existing records indicate the trend of the north to supply the south with manufactured iron in increasing quantities. Sloops sailed from New England to North Carolina with clothing and iron goods which were exchanged for pork and corn.[47] From the north, anchors, iron wares, axes, hoops, nails and steel tools were sent to the south.[48] British manufacturers and merchants protested, vigorously but fruitlessly, against this growing commerce between the northern and southern colonies.[49]

There was also an interchange of iron and iron wares among the northern colonies. Bar iron was sent from Pennsylvania, New Jersey, and New York to New England in exchange for rum, scythes, axes, and ironmongery. While all the northern colonies exported manufactured iron goods, New England led in this commerce. An English writer complained:

> Formerly our Colonies were entirely supplied with Iron and Iron-ware from hence. But since the Erection of Iron-works there, *New-England* now not only furnishes herself, but the other Colonies likewise with sundry sorts of Iron-wares. It may be objected that we send to *America* the same Quantity as usual. If we do so in general, we are sure there is a failure in several Particulars: The demand for Scythes, which formerly was very large from thence, is now come to nothing. The Ax and other Edge-Tools and Nail-Trade thither are annually diminishing. But an increase in our Trade, proportional to our Colonies might reasonably have been expected; and would certainly have followed, had not Forges been there erected. The Erection of more Forges, will naturally produce more Manufactories; and the *Americans* will soon supply themselves with every thing in that Way, which now they have from *Great Britain*.[50]

[47] *Documents Relative to the Colonial History of New York,* V, 609.

[48] *Journals of the House of Commons,* XXII, 851, 852, XXIII, 112, 113; *Interest of the Merchants and Manufacturers of Great Britain,* p. 24.

[49] Penn MSS., XIII, Document 53.

[50] *Interest of Great Britain in Supplying Herself with Iron,* pp. 16-17.

This writer was one of a few in England who clearly saw how the development of American manufactures was interfering with those of Great Britain.

The commerce in iron between the American colonies and the West Indies, Africa, and southern Europe was never large, but must be included in a consideration of colonial iron manufacture. Bar iron, cast-iron utensils, wrought-iron goods, and hoops were exported in small quantities from the northern colonies to many places.[51] Even Virginia sent cast-iron wares of various kinds to the West Indies.[52] Manufactured iron wares were sent from the northern colonies to the Leeward Islands, to Barbados, and to other British possessions. New England iron could be found in many parts of the world. Even in the African slave trade iron became an article of exchange. Bars forged especially for this commerce became known as "African iron." In 1743, twelve bars of such iron were equal to one pound sterling at Sierra Leone.[53] The law of 1764 prohibited the exportation of iron to continental Europe, but it did not forbid shipments to Africa and the West Indies, as well as all parts of America and Asia.[54]

The high stage of development reached by the colonial iron industry prepared the way for the Revolution. The furnaces in the various colonies were taken over for the needs of war to cast ordnance of different kinds.[55] During the many earlier wars, and especially during the French and Indian War, a few of the

[51] Potts MSS.: Colebrookdale Ledgers; Clifford Correspondence I, 51 ff.

[52] William Gooch to Board of Trade, May 19, 1736, Colonial Office Papers, 5:1324. Such products as cast-iron pots, pans, kettles, boxes for cart wheels, etc., were cast at the furnaces.

[53] W. B. Weeden, *Economic and Social History of New England,* II, 470-472.

[54] During the year 1770, bar iron exported from the continental colonies to the West Indies amounted to about 273 tons. In addition, small amounts of cast and wrought-iron wares were sent there. Lord Sheffield, *Observations on the Commerce of the American States,* Appendix V.

[55] For Pennsylvania see *Pennsylvania Colonial Records,* X, 290, 297, 412, 530, 533, 541, 648; XI, 5, 6, 7, 20, 335; XV, 229; *Pennsylvania Archives,* First Series, IV, 721, 731-732, 735, 738; V, 31, 36, 62, 64, 369; Second Series, I, 485, 487, 508, 574-576; Fourth Series, III, 610.

colonial blast furnaces had cast cannon and shot.[56] At the outbreak of the Revolution it was not a very difficult matter to change the moulds used to make iron for the needs of peace to those required for the necessities of war. Weapons of various sorts were made at forges, blacksmith shops, and ironworks of all types. The war gave an impetus to the manufacture of steel, which was in demand for the best grade of weapons.

One of the effects of the restrictions and regulations imposed by Great Britain on the manufacture of iron in the colonies was to bind the ironmasters and iron manufacturers together against the policy of the mother country. The ironmasters of New Jersey, New York, and Pennsylvania met twice in 1773 "to consult necessary measures to be executed in the prosecution of their business of iron making," and to form "some Regulations which seem absolutely necessary in carrying on Iron Works in this part of America."[57] No permanent association of ironmasters, however, was formed during this period.

Colonial ironmasters and others who were closely identified with iron manufacture took an active part in the Revolution. Many of the signers of the Declaration of Independence including George Ross, George Taylor, James Smith, Stephen Hopkins, and Charles Carroll, were directly connected with the iron industry. Philip Livingston was the son of the ironmaster of Livingston Manor. Many of the military leaders were ironmasters, or were associated with the manufacture of iron. George Washington was the son of one of the partners of the famous Principio Company.[58] Among the officers in the Continental armies who had financial interests in ironworks were William Alexander (Lord Stirling), Nathanael Greene, William Thompson, Daniel Udree, Mark Bird, and many others. Of the large

[56] *Pennsylvania Magazine of History,* XXVII (1903), 14.

[57] *New York Gazette and Weekly Mercury,* August 23, 1773, December 20, 1773.

[58] On the death of Augustine Washington, it was not George, but his older half brother, Lawrence, the ex-naval officer and admirer of Admiral Vernon, who fell heir to the Washington iron properties.

number of ironmasters in Pennsylvania, only one took the side of the mother country. Joseph Galloway, the owner of Durham Iron Works,[59] who presented a compromise plan to the Continental Congress,[60] and who favored a policy of reconciliation which would safeguard the rights of the colonies and keep them within the British empire, lost his ironworks and his vast estate.[61] A few Tory ironmasters in other colonies also lost their works and all their property.[62]

From the beginning of the Revolution the British troops, incensed at the extent of the iron industry in the colonies, made great efforts to destroy many of the works. The burning of Valley Forge and its surrounding property is the best known example of such destruction.[63] When Washington and his army camped at Warwick Furnace[64] and at Reading Furnace[65] soon after the Battle of Brandywine, it was with a view of protecting these works which were busily engaged in casting cannon, as well as for the purpose of obtaining supplies to repulse the British under Sir William Howe. Among the ironworks destroyed by the British were those of "some importance" at Warwick on the James River, a few miles below Richmond, in Virginia.[66] In South Carolina, the first important works built there were destroyed, the battles of King's Mountain and Cowpens being fought in this iron-ore region.[67] When the British marched through New Jersey on their retreat from Philadelphia to New York in June 1778, the Mount Holly Iron Works were completely demolished by them.[68] Black Creek Forge, not

[59] Philadelphia County Deed Book, G, III, 243-245.

[60] *Journals of the Continental Congress,* I, 43-48.

[61] *Pennsylvania Colonial Records,* XII, 104.

[62] S. G. Hermelin, *Report About the Mines in the United States of America,* p. 16.

[63] George Weedon, *Valley Forge Orderly Book,* pp. 300-301; *American State Papers: Claims,* I, 74, 522, 754.

[64] W. S. Baker, *Itinerary of General Washington,* p. 91.

[65] George Washington to General A. Wayne, September 19, 1777, Wayne MSS., IV, Document 7.

[66] J. D. Schoepf, *Travels in the Confederation,* II, 71.

[67] J. B. O. Landrum, *Colonial and Revolutionary History of Upper South Carolina,* p. 145. Compare with *Documents Relating to the History of South Carolina,* pp. 3-4.

[68] *New Jersey Gazette,* June 24, 1778.

very far away from Mount Holly, was destroyed about the same time.[69] Many other works, such as the Oxford Iron Works in New Jersey[70] and the Troublesome Creek Iron Works in North Carolina[71] were attacked by British troops, and attempts were made to destroy them. The importance of the works of James Hunter, near Fredericksburg, Virginia, was also grasped by the British. These very extensive works which were established at the outbreak of the Revolution included forges, steel furnaces, air furnaces, a slitting mill, and a plating mill.[72] War materials of all kinds were made, especially muskets, bayonets, camp kettles, and axes. Hunter supplied iron and steel to the Government Arms Factory. When the British troops menaced Fredericksburg in 1780 and 1781, Governor Jefferson rushed General Weeden there to protect them, and British attempts to tear down these important Revolutionary works were frustrated.[73]

[69] *Ibid.*, October 14, 1778.

[70] New Jersey Historical Society, *Proceedings,* New Series, IV, 170-171.

[71] *Colonial and State Records of North Carolina,* XVII, 1005.

[72] *William and Mary College Quarterly,* XXVII, 90-91.

[73] Thomas Jefferson, *Writings* (Ford Ed.), II, 426; Correspondence of General Weeden, June 1-26, 1781, *William and Mary College Quarterly,* XXVII, 167-175.

VII

CONCLUSION

> That Iron, as a Metal, is of infinitely more real Use than Gold, is a Fact too obvious to stand in Need of Proof.—*Reflections on the Importation of Bar Iron,* p. 3.

In summing up the main points of this study, it can be said that the policy of Great Britain in regard to the colonial iron industry was a dismal failure. On the one hand, the hope to secure iron from the colonies for England's growing manufactures in order to throw off the yoke of dependence upon foreign countries for that commodity was not fulfilled, while, on the other hand, the restrictions placed on certain colonial iron manufactures failed entirely. The reason for this failure was not because of stupidity on the part of the mother country in her relations with the colonies, as is so often stated, nor was it an unsuccessful part of a carefully worked out plan to build up a self-sufficing empire. The attempts made to control the production and manufacture of iron in the colonies, and the ineffectiveness of such plans, were due to a variety of factors which have to be analyzed and evaluated before the situation can be clearly understood. The great distance between England and America, which was chiefly responsible for the lack of knowledge about colonial affairs, together with inadequate legislation brought about by the influence of groups of Englishmen whose interests conflicted and clashed, the inability to enforce laws across the sea, and the growing industrial independence of the Americans, were the chief reasons for the failure of this phase of British colonial policy.

If the extent of manufactures in the colonies had been more accurately known in England, it is possible that Parliament would have passed more drastic legislation against the inhabitants of the British possessions in the New World. The Board

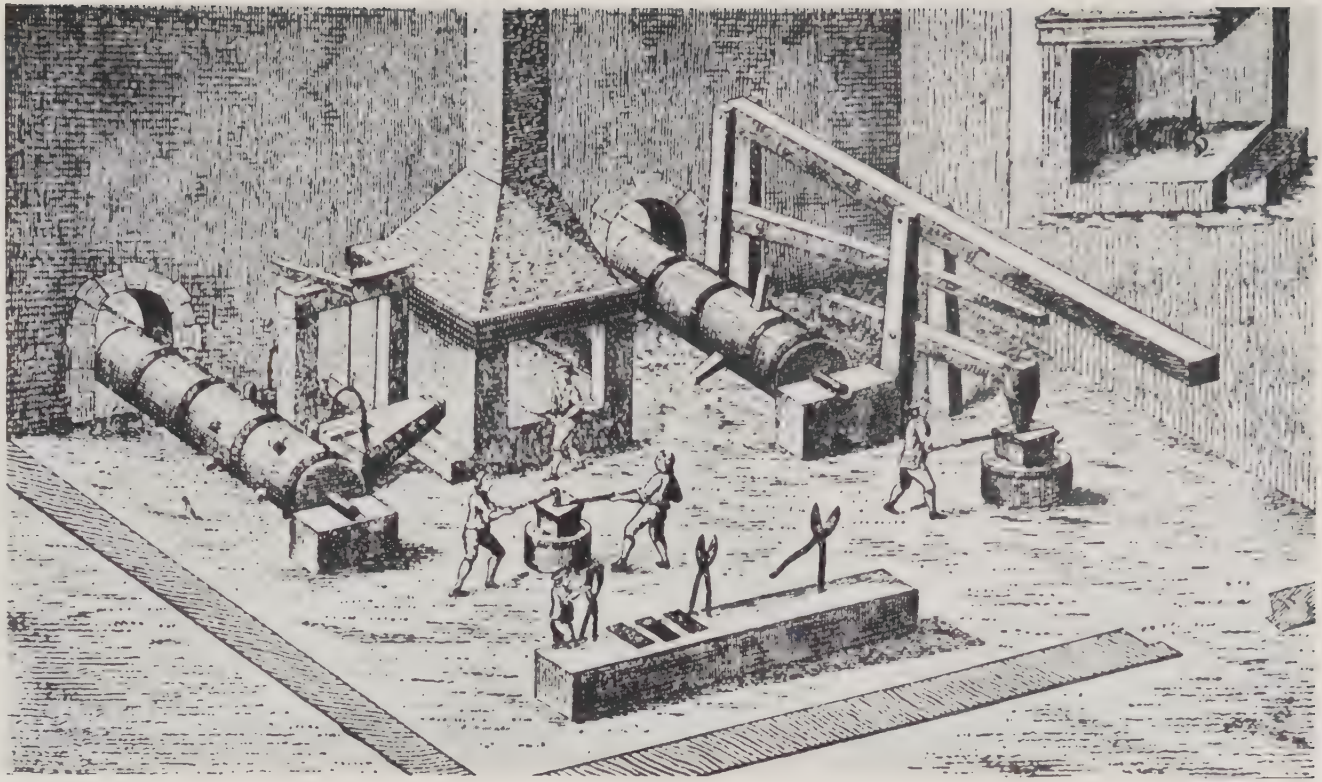
of Trade, which was charged with the duty of keeping informed on American affairs in addition to its functions relating to British trade and commerce in general, at times suspected that manufactures of many kinds were spreading in the colonies. The duty of reporting colonial conditions was imposed on the Governors. They were required to give particulars regarding economic conditions, progress of settlement, statistics of population, the condition of commerce and manufactures, the action of the Assemblies, details of revenue, dangers from Indians and foreign colonies, military resources, and many other phases of colonial life and activity. The instructions to the Governors were poorly obeyed in spite of remonstrances by the Board of Trade. Reports were transmitted more regularly at times, but only a small amount of information regarding industry and manufactures was given by the Governors during the entire period. We can only conjecture, however, as to what Parliament might have done if it had been well informed of the actual condition of colonial manufactures.

The inadequate legislation adopted by Parliament to regulate the colonial iron industry was the result of the conflict between groups of Englishmen who had definite interests which they were seeking to protect and extend. Throughout the period, the colonies were thought of as being subordinate and secondary in importance to the mother country. The needs and interests of the citizens in England were always the first consideration of the British government. When Parliament was confronted with the task of regulating the colonial iron industry for the benefit of those engaged in the industry at home, it soon found that it was impossible to legislate satisfactorily for all groups because of the conflict of interests between them. The demands of the ironmasters for protection for their pig iron interfered with the desire of forge masters to obtain colonial pig iron duty free. Iron manufacturers wanted colonial bar iron duty free, which conflicted with the demands of the forge masters who asked protection for their product. Merchants and shippers looked upon the colonies primarily as markets for their goods, and adherents of the mercantile theory expected to secure

materials from British possessions which were unobtainable in Great Britain. The demands of the groups varied in regard to the extent of suppressing colonial iron manufactures, but most were in agreement that there should be some restrictions. It was these struggling groups that the Board of Trade and Parliament had to conciliate. It is not to be wondered at, therefore, that the laws when finally passed did not accomplish the ends sought by any group.

The removal of the duties from American iron did not result in large amounts being sent to England because of conditions in the colonies. As the production of colonial pig and bar iron developed, it was only natural that the colonists should increase the manufacture of iron implements and tools. It seemed unnecessary for them to send their iron to Great Britain to be worked into manufactures which would be returned to the colonies, when skilled colonial blacksmiths and ironworkers could do the same thing. Then too, Sweden and other European countries from which Great Britain obtained bar iron were in a more advantageous position than America. The American ports were three thousand miles from England, three times or more the distance to Swedish, Russian, and Spanish ports. Thus the average rate of transportation on a ton of iron was much greater from the colonies than from points in Europe where Great Britain received her iron. Colonial labor also was usually many times higher than labor in Europe, and colonial iron, therefore, could not be produced as cheaply as European. For these reasons, the attempt of the mother country to obtain large amounts of colonial iron was defeated and the Americans used their own iron for their manufactures, which relieved them of dependence upon England for such commodities.

Nor was Great Britain successful in any way in restricting certain types of manufacture, for the law was entirely ignored. This was not strange because none of the laws intended to restrict or suppress manufactures, including the restraints on the manufacture of woolen goods and beaver hats, were regarded. The colonists defied them all, as they did the acts regulating commerce and trade, whenever it was possible to do so



PLATING MILL

conveniently. The absence of any effective machinery for enforcing such legislation rendered evasion fairly easy. After 1763, attempts were made to enforce the laws pertaining to commerce and trade, and a new policy was inaugurated which led directly and inevitably to the Revolution. No attempts, however, were made to execute the laws relating to manufactures, and they remained unenforced down to the end of the colonial period.

The antagonism toward British attempts to control the American iron industry was contemporary with the increasing opposition to imperial supremacy. This questioning of British authority over American affairs grew very rapidly from the middle of the eighteenth century. Among those who protested was Stephen Hopkins, the Governor of Rhode Island, who was financially interested in the manufacture of iron in his own colony. In 1764, he startled British and American opinion by his famous dictum: "What have the King and Parliament to do with making a law or laws to govern us by any more than the Mohawks have?" Many other leaders, such as James Otis and John Adams objected to the restrictions against iron manufactures as well as to the entire system of British control. It is worth noting that while the colonists did not obey the legislation enacted for the regulation of the colonial iron industry, much was said and written about the restrictions and they were given a prominent part in the many grievances of the colonists against the mother country during the controversial days which preceded the Revolution.

As iron manufactures developed in America during the eighteenth century, the colonies themselves constituted the chief market for their products, and most of the output was consumed locally, although iron was exported to England, the West Indies, and elsewhere. Long before the period ended, in fact for more than a generation before the Revolution, many of the northern colonies were exchanging iron articles as well as other manufactured goods, for the agricultural products of the south. This partial dependence of the southern colonies upon the north made the final separation with England much easier,

for it was another tie which brought the colonies together in their struggle for freedom.

At the outbreak of the Revolution, Parliament cut off all trade with the American colonies.[1] With the conclusion of peace, the Americans hoped to secure favorable treaties of commerce with the nations of Europe, but they were destined to disappointment.[2] Until 1796, when Jay's treaty went into effect, there was no commercial treaty between the United States and Great Britain.[3] The commerce between the two countries until that year was controlled by the laws of each country. After peace was declared, an act of Parliament, passed in April 1783, renewed commercial intercourse and made it subject to Orders-in-Council issued under authority of that act.[4] Under the Orders-in-Council which followed, American vessels were allowed to carry to England raw and semi-finished materials, unmanufactured goods and naval stores from the United States. There were certain exceptions, which came under the head of raw materials, such as whale oil and other whale products. By 1790, more than seventy-five per cent of the foreign commerce of the United States was with Great Britain, and British vessels carried more than half of this commerce. American vessels, though, were not permitted to enter Great Britain's colonial ports.[5] All proposals for a commercial treaty were rejected until Jay's unsatisfactory treaty was signed.[6]

After 1783 Great Britain's policy in regard to importations of pig iron and bar iron from the United States was a continuation of her colonial policy which had been broken off by the Revolution. Under the Orders-in-Council, pig iron, bar iron,

[1] 15 George III, c. 10; 15 George III, c. 18; 16 George III, c. 5.

[2] F. Wharton, *Diplomatic Correspondence of the American Revolution*, VI, 802.

[3] W. M. Malloy, *Treaties, Conventions*, etc. I, 590 ff.

[4] 23 George III, c. 39; *Acts of the Privy Council, Colonial Series*, 1766-1783, pp. 527 ff.

[5] *Ibid.*, pp. 529 ff.

[6] W. C. Ford (Ed.) *Report of a Committee of the Lords of the Privy Council*, pp. 64-76; E. C. Burnet, "London Merchants on American Trade, 1783," *American Historical Review*, XVIII, 769.

and many types of naval stores produced in the United States could be imported into England on the same terms as iron from any British possession in America. Thus pig iron and bar iron were admitted duty free, although exceedingly high duties on the importation of iron from all other foreign countries into England were continued.[7]

The Jay treaty went into effect in 1796. It was very unsatisfactory to the United States in many respects, especially because American vessels were still excluded from the British West Indies.[8] The general stipulation in the treaty respecting duties was that duties on American goods should not be higher than on like commodities from any other foreign country.[9] The treaty, however, provided also that further duties might be imposed adequate to countervail (but not equal to) the difference of duty on the importation of European and Asiatic goods into the United States in British and American vessels.[10] The object of Great Britain in retaining such a right, according to Rufus King, the United States minister to Great Britain, was not to check American trade, but to protect British navigation on the same principle which America at that time protected hers.[11]

The tariff act passed by Great Britain in 1797 for carrying into execution the provisions of the Jay treaty was an exceedingly liberal one.[12] Great Britain did not take advantage of the terms of the treaty to impose high duties on all importations from the United States. By the act of 1797, naval stores of many kinds, wood, staves, pig iron, and bar iron, were put on the same footing as those imported from British colonies and were admitted free of all duties if carried in British vessels.[13] If carried to England in American vessels a small countervailing duty

[7] W. C. Ford (Ed.) *Report of a Committee of the Lords of the Privy Council,* pp. 6 ff.

[8] S. F. Bemis, *Jay's Treaty,* pp. 24 ff.

[9] *Jay Treaty,* Article XIII; *American State Papers, Foreign Relations.* II, 112.

[10] *Ibid.,* II, 112 f.; *Jay Treaty,* Article XV.

[11] *American State Papers, Foreign Relations,* II, 112 ff.

[12] 37 George III, c. 97.

[13] *Ibid.,* Sections 3, 11, 12, 13.

was imposed.[14] On pig iron and bar iron this was "ten per cent on the amounts of the duties of customs."[15] On pig iron, the duty on foreign importations amounted to 6s. 0½d.; ten per cent of this was estimated to be 6½d.[16] The duty on bar iron from foreign countries in 1797 was £3 4s. 7d.; ten per cent of this was 6s. 5½d.[17] Thus even when carried in American vessels, the countervailing duties on pig iron and bar iron were slight. During the wars of this period, small convoy duties were charged on all importations.[18]

The question arises as to why Great Britain permitted iron and many other materials from the United States to enter her ports either duty free, or on payment of a very low duty. The question is more significant when it is considered that the United States was imposing at this time fairly high duties on iron and iron manufactures from Great Britain and other foreign countries.[19] The answer may be found in the fact that England simply continued the policy which had been built up during the colo-

[14] *Ibid.*, Section 3.

[15] *Ibid.*, Section 11.

[16] E. J. Mascall, *Book of Customs*, p. 56.

[17] *Ibid.*, p. 55.

[18] *Ibid.*, pp. 1 (note), 55, 56.

[19] The duties imposed on pig iron and bar iron imported into the United States under the tariff of 1789 amounted to seven and one-half per cent. In 1792, the duties on iron and iron manufactures were raised to ten per cent, and two years later an additional duty of five per cent was levied on these materials, making a total duty of fifteen per cent *ad valorem*. All duties imposed under the act of 1789 were subject to a discount of ten per cent if the goods were imported in vessels owned by American citizens. By the act of 1794, an additional ten per cent was added to the duties if imported in foreign vessels. Tariff Acts of 1789, 1792, 1794, *House Documents*, 55th Cong. 2nd Sess. No. 562, pp. 9 ff, 29 ff, 34 ff. In his Report on Manufactures in 1791, Alexander Hamilton advised that on account of the high prices obtained for bar iron, it was probable that the free admission of foreign iron "would not be inconsistent with an adequate profit to the proprietors of the iron works." He believed that the increase of bar iron from foreign countries by removing the duties would result in the increase of iron manufactures, and thus the price of domestic bar iron would not decline. He advised caution and suggested that such a measure ought "to be contemplated subject to the lights of further experience, rather than immediately adopted." *American State Papers, Finance*, I, 138. The duties, however, were raised and not taken off.

nial period, and again after 1783 because it was to her interest to do so. The commodities given preference consisted of raw and semi-finished materials which were of importance to "the manufactures, navigation, navy and marine" of England. Only a small amount of iron, chiefly pig iron, was sent to England,[20] the Americans using their iron in their own manufactures. The English ironmasters, therefore, had no cause to complain of competition. On the other hand the high duties on Russian, Swedish, and other foreign iron had been raised to a very high point, partly to obtain a revenue, but also to prevent too great a competition with English iron during the period of the Industrial Revolution, when far-reaching changes were being made in the British iron industry.[21] Certain American products were favored then, not to indulge the United States, but owing to solicitude for cheap and needed raw materials.

The changes brought about in the iron industry between the years 1775 and 1800 placed Great Britain at the head of all iron-producing countries. On the eve of the Industrial Revolution, there was nothing to indicate that by 1850 the British Isles would be producing about one-half of all the iron and steel made throughout the world. During the first three-quarters

[20] *American State Papers, Foreign Relations,* II, 112. For the year ending September 30, 1792, only 3,267 tons of pig iron and 351 tons of bar iron were exported from the United States. Tench Coxe, *View of the United States,* p. 415.

[21] The duties on importations of bar iron into Great Britain were raised as follows:

1782–1795	£2	16s.	2d.	per ton
1796	3	1	9	" "
1797	3	4	7	" "
1798–1802	3	15	5	" "
1803	4	4	4½	" "
1804	4	17	1	" "
1805	5	1	0	" "
1806–1808	5	7	5¾	" "
1809–1812	5	9	10	" "
1813–1818	6	9	10	" "
1819–1825	6	10	0	" " in British vessels

In 1825 drastic reductions were made in the duties on iron and steel, and a new policy was inaugurated. 6 George IV, c. 3.

of the eighteenth century, the production of pig iron and bar iron in Great Britain languished, and it looked as though it would only be a question of time before England would be entirely dependent upon the outside world for all the iron needed in her extensive manufactures.

In 1775 the Russian Empire led the world in the production of pig iron and bar iron, with Sweden a close second. The American colonies produced more iron than Great Britain. The question as to where England would secure her future supply of iron was solved by the Industrial Revolution. The introduction of the steam engine, the technological changes, and the substitution of coke for charcoal as a fuel brought about England's supremacy as an iron-producing country. This position was maintained until after the middle of the nineteenth century when other nations came rapidly to the front.[22] Before 1900 the United States was in the lead in the production of iron and steel. During the years that followed this country has come to occupy the position, although in a vastly more extended scale, which Great Britain occupied during the middle of the nineteenth century, producing about one-half of all the iron and steel made in the world.

The rise of the American iron industry has been remarkable. The entire output in all the colonies in 1700 could not have exceeded 1,500 tons at the most, and the probabilities are that it was less. By 1775 it must have reached many times this amount annually. There are no exact statistics to show this, but on the basis of scattered accounts, and the number of works in operation, it is fair to estimate that the total amount of iron produced in the colonies by 1775 averaged about 30,000 tons annually. This was about one-seventh the entire amount produced in the world. Thus by the time of the Revolution the colonies were an important factor in the production of the world's supply of iron. From this time, however, although the American iron industry expanded to a considerable extent, the United States fell behind in the proportion of iron made because of the more rapid devel-

[22] Great gains were made after 1850 by Germany and France.

opment of the British industry. It was not until the Civil War that the United States again produced one-seventh of the entire output of the world. During the next few decades following the Civil War, this country began to surpass all competitors, and assumed the position of leadership, which it still holds in the production of iron and steel.

The change from an iron age to a steel age should be noted. Credit belongs to Britain for having produced men through whose inventions the great changes occurred in the iron industry. The two Abraham Darby's, Henry Cort, Peter Onions, John Wilkinson, James Watt, and Matthew Boulton were prominent among those who revolutionized the production of iron. Many men in Great Britain, likewise, played a leading part in the discovery of new processes for making steel. Chiefly through the inventions of Benjamin Huntsman, Sir Henry Bessemer, Sidney Thomas, Percy Gilchrist, John Marshall Heath, C. W. Siemens,[23] and others, the steel age was ushered in.

Just before the middle of the eighteenth century, Benjamin Huntsman, a clockmaker and amateur surgeon, not being satisfied with the grade of steel made in his day, produced steel of a superior quality by melting "blister" and "shear" steel in small crucibles. Such "crucible" steel, being hard, tenacious, and also flexible, proved to be very suitable for clock and watch springs, razors, and tools of the highest grade.[24] Although Huntsman perfected his process of making superior steel in crucibles of clay heated by coke, about 1740, the amount of such steel produced before 1860 was relatively small.

It was out of the technological changes which were being developed about the middle of the nineteenth century that steel gradually displaced iron. By 1856, Sir Henry Bessemer had perfected the "pneumatic" process of making steel, and made the announcement of his invention to the world by reading a paper on the "Manufacture of Malleable Iron and Steel without Fuel" before the British Association for the Advancement of Science. The process was introduced into the United States

[23] W. T. Jeans, *The Creators of the Age of Steel,* pp. 9 ff.

[24] Samuel Smiles, *Industrial Biography,* pp. 135 ff.

during the Civil War.[25] By the close of that conflict, steel made by the Bessemer process had become a commodity of commerce. Through the discoveries of Thomas and Gilchrist, the Bessemer process was applied to ores high in phosphorus. This process has made Germany's great industrial development possible. Another process, destined eventually to take the lead in steel production, was worked out in France and England. This was the open-hearth or Siemens-Martin process of converting iron into steel.

Both the Bessemer and open-hearth processes were rapidly adopted in the United States during the period following the Civil War. One development of great importance to the steel industry which took place in this period was due, not to invention, but to the discovery and use of the iron ores of the Lake Superior region. The opening of the Sault Ste. Marie Canal in 1855 and other improvements in transportation have resulted in sending vast quantities of the ore to the east to be smelted and made into steel. Cheap water transportation for the Lake Superior ores, together with the availability of good coking coal, has made the Pittsburgh district one of the greatest iron and steel centers in the world.

The vast iron and steel industry of the United States had its

[25] J. M. Swank, *History of the Manufacture of Iron in All Ages,* p. 409. Many years before Bessemer announced his invention, William Kelly was working independently in the United States on the same principle of transforming iron into steel by blowing cold air through molten iron, thus producing intense heat and burning out the carbon as well as other impurities. At his works near Eddyville, Kentucky, Kelly made such steel as early as 1847, but there was little demand for it and he was ridiculed for his idea. After Bessemer received a United States patent in 1856, Kelly proved that he had used the same process many years before, and a patent was granted to him also in 1857. Experiments were conducted for perfecting this process of making steel at the plant of the Cambria Steel Company at Johnstown, Pennsylvania. It was not until 1864 that the process was actually adopted in this country, when steel was made under Kelly's patents at works in Wyandotte, Michigan. The next year, Alexander Holley, an American engineer, obtained the right to manufacture steel under Bessemer's patents, and began making steel at Troy, New York, and at Harrisburg, Pennsylvania. In 1866, the two rival companies merged, and this method of making steel thereafter became known as the Bessemer process. For a statement written by Kelly in regard to his experiments see *Ibid.,* pp. 397-399.

origin in the colonial period. The initiative and enterprise of the colonial ironmasters overcame all difficulties, including British regulations and restrictions, the lack of capital, difficulties in obtaining skilled labor, and the handicap of poor transportation facilities. In spite of these obstacles, the colonial industry developed, and before the outbreak of the struggle which resulted in independence the American colonies ranked not far behind the leading countries of the world in the production of iron. Moreover, the foundations of a great industrial structure was laid.

APPENDICES

A

A LIST OF FORGES AND FURNACES WITHIN THE PROVINCE OF THE MASSACHUSETTS BAY AND OF THE PERSONS' NAMES BY WHOM THEY ARE OWNED OR OCCUPIED. (1758)*

Counties	*Towns*	*Forges*	*Furnaces*	*Owners or Occupiers*
Suffolk	Dedham	1	–	William Avery
	Walpole	1	–	Morse
	Walpole	1	–	Capt. Clap
	Stoughton	1	–	Nathaniel Leonard
	Stoughton	1	–	Elkanah Billings
	Wrentham	–	1	Josiah Maxey
	Needham	1	–	Oliver Pratt
Essex	Salisbury	1	–	Philip Rowell
Middlesex	Westford	1	–	Keep
Hampshire	Springfield	1	–	Joseph Dwight
	Sheffield	1	–	John Ashley
Worcester	Western	2	–	Keys, Blackmore & Hayward
	Western	–	1	David Keys
	Leicester	1	–	Lieut. Tucker & Others
	Sutton	1	–	John Hazleton
	Uxbridge	1	–	Nicholas Baylis
Plymouth	Middleboro	1	–	Peter Oliver
	Middleboro	1	–	Elkanah Leonard
	Wareham	1	–	Mrs. Lothrop
	Rochester	1	–	Amos Bates
	Plympton	-	–	Warden & Goodwin
	Plympton	-	–	John Beecham

* This list was compiled by Andrew Oliver in 1758 for Governor Thomas Pownall, who sent it to the Board of Trade. Colonial Office Papers 5:889.

Counties	*Towns*	*Forges*	*Furnaces*	*Owners or Occupiers*
	Bridgwater	1	–	Capt Bass
	Bridgwater	1	–	Codman
	Bridgwater	1	–	Iona Carver
	Bridgwater	1	–	Daniel Hayward & Co.
	Bridgwater	1	un-improved	John Miller
	Kingston	1	–	Samuel Seabury
	Kingston	1	–	Jonathan Holmes
	Hanover	1	–	Thomas Jocelyn
	Pembroke	1	–	Elijah Cushing
	Hanover	1	–	Palmer
	Plympton	–	1	Joseph Scott & Co.
	Plympton	–	1	Mrs. Lothrop & Co.
	Kingston	–	1	Gamaliel Badford & Co.
	Halifax	–	1	Thos. Croade & Co.
	Bridgwater	–	1	Josiah Edson & Co.
	Bridgwater	–	1	Nicholas Sever & Co.
	Bridgwater	–	1	James Bowdoin
	Bridgwater	–	1	unimproved
	Hanover	–	1	Thomas Jocelyn
Barnstable	———	None		———
Bristol	Norton	1	–	George Leonard
	Norton	1	–	Ephraim Leonard
	Norton	1	–	William Stone
	Raynham	1	–	Elijah Leonard
	Taunton	1	–	Zephary Leonard
	Taunton	1	–	James Leonard
	Taunton	1	–	Baylis & Laughton
	Easton	1	–	Eliphalet Leonard
	Freetown	1	–	Ebenezer Hathaway
	Attleboro	1	–	Sweet & Merrit
	Taunton	–	1	Mrs. King
	Raynham	–	1	Seth Leonard
	Easton	–	1	Mrs. Williams
York	———	None		———
Dukes	———	None		———
Nantuckett	———	None		———
		41	14	

B

EXPORTS OF IRON FROM THE AMERICAN COLONIES TO GREAT BRITAIN*

(In tons, cwts., qrs., and lbs.)

1718-1749

	1718 Bar Iron	*1719* Bar Iron	*1720* Bar Iron	*1721* Bar Iron	*1722* Bar Iron
Carolina					
New England					
New York					
Pennsylvania					
Virginia-Maryland	3.7.0.0	0.10.3.10	4.4.3.21	15.7.1.6	

	1723 Bar Iron & Pig Iron	*1724* Bar Iron & Pig Iron	
Carolina			
New England			
New York			
Pennsylvania			
Virginia-Maryland	15.2.3.22	7.0.0.0	202.9.0.0

	1725 Bar Iron & Pig Iron	*1726* Bar Iron & Pig Iron	
Carolina		0.1.1.0	
New England		1.7.1.11	
New York			
Pennsylvania			32.11.3.22
Virginia-Maryland	137.6.3.19	0.3.0.0	263. 0.3. 3

*House of Lords MSS., No. 185.

	1727		*1728*	
	Bar Iron & Pig Iron		Bar Iron & Pig Iron	
Carolina				
New England				
New York				
Pennsylvania		76.13.2.26		243.1.3. 1
Virginia-Maryland	2.12.0.25	407. 9.3.13		643.6.0.24

	1729		*1730*	
	Bar Iron & Pig Iron		Bar Iron & Pig Iron	
Carolina	0.2.0.0	5. 1.0.0	9.0.0.0	0.10.3. 1
New England				
New York				
Pennsylvania		274. 6.1.21		188.16.0.20
Virginia-Maryland		852.16.1.11		1526.15.1.15

	1731		*1732*	
	Bar Iron & Pig Iron		Bar Iron & Pig Iron	
Carolina				
New England				
New York				
Pennsylvania		169.3.2.15		106.11.1.15
Virginia-Maryland		2081.2.0.27		2226. 3.2.0

	1733		*1734*	
	Bar Iron & Pig Iron		Bar Iron & Pig Iron	
Carolina			0.0.2.12	7.0.0.0
New England				
New York	0.11.3.0			
Pennsylvania		95. 5.1.18		147.7.3.11
Virginia-Maryland		2309.11.3.22		2042.2.2. 3

	1735		*1736*	
	Bar Iron &	Pig Iron	Bar Iron &	Pig Iron
Carolina		3. 9.0.0		
New England		0. 6.0.0		
New York				
Pennsylvania	10.17.3.0	195.11.2.22	5.9.2.14	270.19.1.19
Virginia-Maryland	44. 9.0.21	2362. 8.0.17		2458. 0.0. 3

	1737		*1738*	
	Bar Iron &	Pig Iron	Bar Iron &	Pig Iron
Carolina				4.0 .0.0
New England		27. 5.0.0		14.0 .0.0
New York				
Pennsylvania		168.16.0. 1		228.0 .2.10
Virginia-Maryland		2119.16.1.25		2112.18.3.19

	1739		*1740*	
	Bar Iron &	Pig Iron	Bar Iron &	Pig Iron
Carolina		1. 9.2.27		2. 0.0.0
New England		3.18.1.0	0.4.1.21	94. 0.1.12
New York				
Pennsylvania		170. 5.3.19		159. 4.2.22
Virginia-Maryland		2242. 2.2.14	5.0.0.0	2020. 2.0.22

	1741		*1742*	
	Bar Iron &	Pig Iron	Bar Iron &	Pig Iron
Carolina				
New England		42.16.1.16		5. 0.0.0
New York				
Pennsylvania		153. 4.1.25		143.16.3.18
Virginia-Maryland	5.0.0.0.	3261. 8.1. 5		1926. 3.1.75

	1743	*1744*	
	Bar Iron & Pig Iron	Bar Iron & Pig Iron	
Carolina	18.19.0.16	20. 1.0.19	
New England	25.11.1.17		
New York	81. 4.2. 7	5.16.0.0	
Pennsylvania	62.12.0.23	87.15.0.0	
Virginia-Maryland	2816. 1.1.15	57.0.0.0	1748. 4.1. 3

	1745		*1746*	
	Bar Iron & Pig Iron		Bar Iron & Pig Iron	
Carolina	25. 9.3.0			
New England	2. 0.0.0			
New York	18.12.0.0			29. 0.0.0
Pennsylvania	97. 7.1. 7		3.9.1.0	103. 1.3.11
Virginia-Maryland	4.5.2.14	2130.16.1.10	193.8.3.12	1729. 1.0. 2

	1747		*1748*	
	Bar Iron & Pig Iron		Bar Iron & Pig Iron	
Carolina				1. 4.1.21
New England				
New York	13. 0.0.0			22. 9.1.80
Pennsylvania	24.14.3.20			114.10.0.0
Virginia-Maryland	82.11.2.11	2119. 0.3.24	4.0.0.0	2017.11.3.10

	1749	
	Bar Iron & Pig Iron	
Carolina		
New England		
New York	16.10.3.0	
Pennsylvania	166.11.3.17	
Virginia-Maryland	1575. 5.1.27	

C

PIG AND BAR IRON EXPORTED TO GREAT BRITAIN BY THE AMERICAN COLONIES FROM 1750 TO 1755*

	Colonies	*Pig Iron*			*Bar Iron*		
		Tons	*Cwts.*	*Qrs.*	*Tons*	*Cwts.*	*Qrs.*
1750.	Carolina						
	New England	21	1	12			
	New York	75	12	1			
	Pennsylvania	318	9	3			
	Virginia & Maryland	2,508	16	1	5	17	3
1751.	Carolina	17	4	0			
	New England	9	16	2			
	New York	33	0	3	2	0	0
	Pennsylvania	199	15	2			
	Virginia & Maryland	2,950	5	3	3	4	2
1752.	Carolina	20	0	0			
	New England						
	New York	41	5	0			
	Pennsylvania	156	8	2	64	16	2
	Virginia & Maryland	2,762	8	0	16	10	2
1753.	Carolina	10	0	0			
	New England	40	10	1	2	8	0
	New York	97	4	3			
	Pennsylvania	242	15	1	147	13	2
	Virginia & Maryland	2,347	9	2	97	18	0
1754.	Carolina	20	0	0			
	New England	4	16	0			
	New York	115	16	2	6	10	0
	Pennsylvania	512	19	3	110	9	3
	Virginia & Maryland	2,591	4	3	153	15	1
1755.	Carolina	14	13	0			
	New England						
	New York	457	8	0	11	12	0
	Pennsylvania	836	6	1	79	5	0
	Virginia & Maryland	2,132	15	1	299	1	3

* Harry Scrivenor, *History of the Iron Trade,* Appendix, p. 340. The originals of these tables were destroyed by fire not long after Scrivenor had copied them in the House of Lords. A few of these figures may be found in various places in the Board of Trade Papers. They check up exactly with Scrivenor's figures, and the tables may therefore be considered accurate.

D

PIG AND BAR IRON EXPORTED BY THE AMERICAN COLONIES TO GREAT BRITAIN FROM 1761 TO 1776*

Year	*Pig Iron*				*Bar Iron*			
	Tons	*Cwts.*	*Qrs.*	*Lbs.*	*Tons*	*Cwts.*	*Qrs.*	*Lbs.*
1761	2,766	2	3	12	39	1	0	0
1762	1,766	16	0	2	122	12	2	14
1763	2,566	8	0	25	310	9	3	2
1764	2,554	8	3	21	1,059	8	0	10
1765	3,264	8	1	22	1,078	15	0	16
1766	2,887	5	1	15	1,257	14	3	9
1767	3,313	2	1	19	1,325	19	0	18
1768	2,953	0	2	14	1,989	11	0	6
1769	3,401	12	2	2	1,779	13	1	23
1770	4,232	18	1	18	1,716	8	0	21
1771	5,303	6	3	13	2,222	4	3	24
1772	3,724	19	2	25	965	15	0	23
1773	2,937	13	0	2	837	15	0	6
1774	3,451	12	2	19	639	0	0	23
1775	2,996	0	2	24	916	5	2	11
1776	316	1	2	8	28	0	0	0

* Harry Scrivenor, *History of the Iron Trade,* Appendix, pp. 343-344.

E

AN ACCOUNT OF THE QUANTITY OF BAR IRON EXPORTED TO THE BRITISH PLANTATIONS FROM CHRISTMAS 1746 TO CHRISTMAS 1749, DISTINGUISHING EACH YEAR*

	Tons	*Cwts.*	*Qrs.*	*Lbs.*
Christmas 1746 to Christmas 1747—	26	13	2	6
Christmas 1747 to Christmas 1748—	57	4	1	17
Christmas 1748 to Christmas 1749—	159	18	2	23
	243	16	2	18

*House of Lords MSS., No. 185.

F

ESTIMATED OUTPUT OF PRODUCTION OF IRON FROM 1700 TO 1800

Year	*American Colonies (United States)*	*World*
1700	1,500 tons	100,000 tons
1750	10,000 tons	150,000 tons
1775	30,000 tons	210,000 tons
1790	38,000 tons	325,000 tons
1800	45,000 tons	400,000 tons

These estimates include pig iron, cast-iron wares made at blast furnaces, and bar iron produced at bloomeries directly from the ore.

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